

=> file reg  
FILE 'REGISTRY' ENTERED AT 16:51:17 ON 12 AUG 2004  
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=> d his nofile 11-

FILE 'REGISTRY' ENTERED AT 14:50:04 ON 12 AUG 2004  
L1           1 SEA ABB=ON PLU=ON ZINC OXIDE/CN  
L2           1 SEA ABB=ON PLU=ON PALLADIUM/CN  
L3           5 SEA ABB=ON PLU=ON (1314-13-2 AND 7440-05-3)/CRN  
L4           103 SEA ABB=ON PLU=ON (ZN(L)O(L)PD)/ELS  
L5           7 SEA ABB=ON PLU=ON (L3 OR L4) AND 3/ELC.SUB  
L6           111 SEA ABB=ON PLU=ON (ZN(L)O)/ELS AND 2/ELC.SUB

FILE 'CAPLUS' ENTERED AT 15:02:46 ON 12 AUG 2004  
L7           1 SEA ABB=ON PLU=ON L3/CAT OR L5/CAT  
L8           1409 SEA ABB=ON PLU=ON L6 AND L2  
L9           690 SEA ABB=ON PLU=ON L8 AND CAT/RL  
L10          691 SEA ABB=ON PLU=ON L7 OR L9  
L11          53782 SEA ABB=ON PLU=ON PORE (2A) (SIZE OR VOLUME OR MICRON OR  
MU)  
L12          10 SEA ABB=ON PLU=ON L10 AND L11

FILE 'REGISTRY' ENTERED AT 15:06:30 ON 12 AUG 2004  
L13          1 SEA ABB=ON PLU=ON RUTHENIUM/CN  
L14          1 SEA ABB=ON PLU=ON CERIUM/CN  
L15          1 SEA ABB=ON PLU=ON ZIRCONIA/CN  
L16          1 SEA ABB=ON PLU=ON ALUMINA/CN  
L17          4 SEA ABB=ON PLU=ON (7440-05-3 OR 7440-18-8)/CRN AND  
7440-45-1/  
               CRN AND (1314-23-4 OR 1344-28-1)/CRN

FILE 'REGISTRY' ENTERED AT 15:17:18 ON 12 AUG 2004  
L18          3 SEA ABB=ON PLU=ON ((PD OR RU)(L)CE(L)(ZR OR AL)(L)O)/ELS  
AND  
              4/ELC.SUB  
L19          7 SEA ABB=ON PLU=ON L17 OR L18

FILE 'CAPLUS' ENTERED AT 15:20:59 ON 12 AUG 2004  
L20          2 SEA ABB=ON PLU=ON L19/CAT  
L21          462 SEA ABB=ON PLU=ON (L13 OR L2) AND L14 AND (L15 OR L16)  
AND

Henderson

CAT/RL

L22 377 SEA ABB=ON PLU=ON CERIUM (2A) PROMOT?

L23 14 SEA ABB=ON PLU=ON L21 AND L22

L24 84 SEA ABB=ON PLU=ON (L13 OR L2 OR RU OR PD OR RUTHENIUM OR PALLADIUM) (L) (CERIUM OR CE OR L14) (L) (L15 OR ZRO? OR ZIRCONIA OR AL2O3 OR ALUMINA OR L16) (L) PROMOT? AND CAT/RL

L25 11 SEA ABB=ON PLU=ON (PALLADIUM-RUTHENIUM) (L) (ZIRCONIA OR ALUMINA OR ZRO? OR AL2O3) AND CAT/RL

L26 116 SEA ABB=ON PLU=ON L12 OR L20 OR L24 OR L23 OR L25

FILE 'CAPLUS' ENTERED AT 15:42:07 ON 12 AUG 2004

L27 8937 SEA ABB=ON PLU=ON (STEAM OR WATER (2A) GAS OR WATER (2A) VAPOR) (2  
A) REFORMING OR HYDROFORMING

L28 53 SEA ABB=ON PLU=ON (METHYL OR ETHYL OR PROPYL OR ISOPROPYL OR BUTYL OR ISOBUTYL OR T-BUTYL) (L) (ALCOHOL OR ALC) (L) REFORMING  
OR METHAFORMING

L29 2377 SEA ABB=ON PLU=ON (METHANOL OR ETHANOL OR PROPANOL OR ISOPROPANOL OR BUTANOL OR ISOBUTANOL OR T-BUTANOL OR MECH OR ETOH OR PROH OR I-PROH OR BUOH OR I-BUOH OR T-BUOH) (L) (REFORMIN  
G)

L30 6 SEA ABB=ON PLU=ON (L27 OR L28 OR L29) AND L26

L31 243624 SEA ABB=ON PLU=ON STEAM? OR (WATER OR H2O) (2A) GAS## OR WATARGAS##

L32 42109 SEA ABB=ON PLU=ON REFORM?

FILE 'REGISTRY' ENTERED AT 16:37:36 ON 12 AUG 2004

E METHANOL/CN

L35 1 SEA ABB=ON PLU=ON METHANOL/CN  
E ETHANOL/CN

L36 1 SEA ABB=ON PLU=ON ETHANOL/CN  
E N-PROPANOL/CN

L37 1 SEA ABB=ON PLU=ON N-PROPANOL/CN  
E ISOPROPANOL/CN

L38 1 SEA ABB=ON PLU=ON ISOPROPANOL/CN  
E N-BUTANOL/CN

L39 1 SEA ABB=ON PLU=ON N-BUTANOL/CN  
E ISOBUTANOL/CN

L40 1 SEA ABB=ON PLU=ON ISOBUTANOL/CN  
E TERT-BUTANOL/CN

L41            1 SEA ABB=ON PLU=ON TERT-BUTANOL/CN  
               E SEC-BUTANOL/CN  
L42            1 SEA ABB=ON PLU=ON SEC-BUTANOL/CN  
L43            8 SEA ABB=ON PLU=ON (L35 OR L36 OR L37 OR L38 OR L39 OR  
L40 OR  
               L41 OR L42)

FILE 'CAPLUS' ENTERED AT 16:44:53 ON 12 AUG 2004  
 L44 1025781 SEA ABB=ON PLU=ON L43 OR (METHYL OR ETHYL OR PROPYL OR  
 BUTYL OR ISOPROPYL OR ISOBUTYL) (2A) (ALC# OR ALCOHOL#) OR MEOH OR  
 ETOH OR PROH OR NPROH OR IPROH OR BUOH OR IBUOH OR SBUOH  
 OR TBUOH OR METHANOL# OR ETHANOL# OR PROPANOL# OR  
 ISOPROPANOL# OR BUTANOL# OR ISOBUTANOL#  
 L45 751969 SEA ABB=ON PLU=ON ALC# OR ALCOHOL#  
 L46 6924 SEA ABB=ON PLU=ON FISCHER# (2A) TROPSCH#  
 L47 4 SEA ABB=ON PLU=ON L26 AND L31  
 L48 12 SEA ABB=ON PLU=ON L26 AND L32  
 L49 4 SEA ABB=ON PLU=ON L47 AND L48  
 L50 12 SEA ABB=ON PLU=ON L26 AND L44  
 L51 5 SEA ABB=ON PLU=ON L26 AND L45  
 L52 6 SEA ABB=ON PLU=ON L26 AND L46  
 L53 22 SEA ABB=ON PLU=ON (L47 OR L48 OR L50 OR L51 OR L52) NOT  
 L30  
 L54 88 SEA ABB=ON PLU=ON L26 NOT (L30 OR L53)

=> file caplus  
FILE 'CAPLUS' ENTERED AT 16:52:23 ON 12 AUG 2004  
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.  
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=> d 153 1-22 cbib abs hitstr hitind

L53 ANSWER 1 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
2003:546508 Document No. 139:294208 Designing New High Oxygen Mobility  
Supports to Improve the Stability of Ru Catalysts Under Dry  
**Reforming** of Methane. Menad, S.; Ferreira-Aparicio, P.; Cherifi,  
O.; Guerrero-Ruiz, A.; Rodriguez-Ramos, I. (Instituto de Catalisis y

Henderson

Petroleoquimica CSIC, Madrid, 28049, Spain). Catalysis Letters, 89(1-2), 63-67 (English) 2003. CODEN: CALEER. ISSN: 1011-372X. Publisher: Kluwer

Academic/Plenum Publishers.

AB The application of a novel Ce0.5Zr0.5O2 mixed oxide prepd. by the microemulsion method as a support of Ru catalysts for the **reforming** of CH4 with CO2 originates a high-activity catalytic system with excellent stability under reaction conditions. The support

characteristics clearly det. the catalytic stability of Ru catalysts under CH4 + CO2 reaction conditions. The introduction of cerium as a **promoter** in the ZrO2 structure is shown to improve the catalyst performance by increasing the oxygen mobility in the support and consequently reducing deactivation by carbon

deposition during reaction.

CC 51-11 (Fossil Fuels, Derivatives, and Related Products)

ST methane carbon dioxide **reforming** catalyst support synthesis gas; dry **reforming** ruthenium catalyst support cerium zirconium oxide

IT **Reforming** catalysts

Synthesis gas manufacturing

(stability of Ru catalysts under dry **reforming** of methane)

IT 7440-44-0, Carbon, formation (nonpreparative)

RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)  
(catalyst coke deposition, control of; stability of Ru catalysts under

dry **reforming** of methane)

IT 53169-24-7, Cerium zirconium oxide (Ce0.5Zr0.5O2)

RL: CAT (**Catalyst use**); USES (Uses)

(catalyst supports; stability of Ru catalysts under dry **reforming** of methane)

IT 74-82-8, Methane, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(stability of Ru catalysts under dry **reforming** of)

IT 7440-18-8, Ruthenium, uses

RL: CAT (**Catalyst use**); USES (Uses)

(stability of Ru catalysts under dry **reforming** of methane)

IT 124-38-9, Carbon dioxide, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(stability of Ru catalysts under dry **reforming** of methane)

L53 ANSWER 2 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN

2003:545775 Document No. 139:103488 Method and apparatus for producing high-molecular-weight liquid hydrocarbons from air and methane and/or

Henderson

natural gas. Harford, Steven Thomas; Borsa, Alessandro Giorgio; Vanderborgh, Nicholas Ernest (Blue Star Sustainable Technologies Corporation, USA). U.S. US 6593377 B1 20030715, 6 pp. (English).

CODEN:

USXXAM. APPLICATION: US 2002-83176 20020226.

AB A method is described for converting a mixt. of a low-mol.-wt. hydrocarbon

gas and air into a C5+ liq. hydrocarbon having direct utility as a compression-ignition fuel comprises: providing a packed-bed catalytic partial oxidn. reactor; providing a first catalyst in the catalytic partial oxidn. reactor selected from a platinum-group catalyst, a **promoted** platinum-group catalyst, a rhodium catalyst, and a **platinum-promoted** rhodium catalyst; providing a mixt. of low-mol.-wt. hydrocarbon gas and air to an input of the catalytic

partial

oxidn. reactor; and providing a first packed-bed **Fischer-Tropsch** reactor. The process further comprises: providing a second supported catalyst in a first **Fischer-Tropsch** reactor consisting of 3-60 parts cobalt and 0.1-100 parts of at least

one

metal selected from **cerium**, lanthanum, platinum, and **ruthenium** per 100 parts of a support selected from silica, **alumina**, and combinations of silica and **alumina**; providing an output of the catalytic partial oxidn. reactor to an

input of

the first **Fischer-Tropsch** reactor; and sepg. an output of said first **Fischer-Tropsch** reactor into a first liq.-phase compression-ignition fuel output and a first gas-phase

output

in the absence of recycling of any portion of the output of the first **Fischer-Tropsch** reactor to the catalytic partial oxidn. reactor. A process flow diagram is presented.

IC ICM C07C027-00

NCL 518706000; 518702000; 518703000; 518715000

CC 51-9 (Fossil Fuels, Derivatives, and Related Products)

Section cross-reference(s): 23, 45, 48

ST liq fuel manuf natural gas conversion **Fischer Tropsch** reaction; methane oxidn **Fischer Tropsch** reaction manuf liq hydrocarbon fuel

IT Platinum-group metals

(Uses) RL: **CAT (Catalyst use)**; EPR (Engineering process); PEP (Physical, engineering or chemical process); PROC (Process); USES

(catalysts; method and app. for producing high-mol.-wt. liq. hydrocarbons from air and methane and/or natural gas)

IT    **Fischer-Tropsch catalysts**  
      **Fischer-Tropsch reaction**  
      **Oxidation catalysts**  
            (method and app. for producing high-mol.-wt. liq. hydrocarbons  
from air  
            and methane and/or natural gas using)  
IT    1344-28-1, Alumina, uses    7631-86-9, Silica, uses    159995-97-8,  
Aluminum  
      silicon oxide  
RL: **CAT (Catalyst use)**; EPR (Engineering process); PEP  
      (Physical, engineering or chemical process); PROC (Process); USES  
(Uses)  
            (catalyst support; method and app. for producing high-mol.-wt. liq.  
hydrocarbons from air and methane and/or natural gas using)  
IT    7439-91-0, Lanthanum, uses    7440-06-4, Platinum, uses    7440-16-6,  
Rhodium, uses    7440-18-8, Ruthenium, uses    7440-45-1, Cerium, uses  
7440-48-4, Cobalt, uses  
RL: **CAT (Catalyst use)**; EPR (Engineering process); PEP  
      (Physical, engineering or chemical process); PROC (Process); USES  
(Uses)  
            (catalysts; method and app. for producing high-mol.-wt. liq.  
hydrocarbons from air and methane and/or natural gas)

L53 ANSWER 3 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
2003:236976 Document No. 138:403879 An integrated process of a two-stage  
fixed bed syngas production and F-T synthesis for GTL in remote gas  
field.

Dai, Xiaoping; Yu, Changchun; Li, Qiang; Zhang, Changbin; Jiang,  
Qiying;

Shen, Shikong (The Key Laboratory of Catalysis, CNPC, University of  
Petroleum, Beijing, 102249, Peop. Rep. China). Chinese Journal of  
Chemical Engineering, 11(1), 85-89 (English) 2003. CODEN: CJCEEB.

ISSN:

1004-9541. Publisher: Chemical Industry Press.

AB    A novel process for catalytic oxidn. of methane to synthesis gas  
(syngas),

which consists of two consecutive fixed-bed reactors with air  
introduced

into the reactors, integrated **Fischer-Tropsch**  
synthesis, was studied. At the same time, a catalytic combustion  
technol.

was studied for using the F-T offgas to generate heat or power energy.  
The two-stage fixed reactor process keep away from explosive limits of  
CH<sub>4</sub>/O<sub>2</sub> mixt. The integrated process is fitted to produce diesel oil

and

Henderson

lubricating oil in remote gas field.

IT 7440-05-3, Palladium, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (loaded with platinum on  $\gamma$ -alumina, methane oxidn. catalyst;  
 integrated process of two-stage fixed bed syngas prodn. and F-T  
 synthesis for GTL in remote gas field)

RN 7440-05-3 CAPLUS  
 CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

IT 7440-45-1, Cerium, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (silica promoted with Ce/Co; integrated process of two-stage  
 fixed bed syngas prodn. and F-T synthesis for GTL in remote gas  
 field)

RN 7440-45-1 CAPLUS  
 CN Cerium (8CI, 9CI) (CA INDEX NAME)

Ce

IT 1344-28-1, Alumina, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 ( $\gamma$ -, Pd-Pt loaded, support, methane oxidn. catalyst; integrated  
 process of two-stage fixed bed syngas prodn. and F-T synthesis for  
 GTL  
 in remote gas field)

RN 1344-28-1 CAPLUS  
 CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

CC 51-11 (Fossil Fuels, Derivatives, and Related Products)  
 Section cross-reference(s): 67

ST integrated stage syngas **Fischer Tropsch** fuel natural  
 gas oxidn; fixed bed FT catalyst diesel lubricating oil perovskite  
 lanthanum; lanthanum promoted catalysis combustion partial oxidn  
**Fischer Tropsch** hydrogenation

IT Diesel fuel  
 Fischer-Tropsch reaction  
 Lubricating oils  
 Perovskite-type crystals

Henderson

Synthesis gas  
 (integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for GTL in remote gas field)

IT 7631-86-9, Silica, uses  
 RL: **CAT (Catalyst use); USES (Uses)**  
 (Ce/Co promoted; integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for GTL in remote gas field)

IT 173558-62-8, Aluminum magnesium oxide ( $\text{Al}_2\text{MgO}_3$ )  
 RL: **CAT (Catalyst use); USES (Uses)**  
 (La<sub>2</sub>O<sub>3</sub>-promoted; integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for GTL in remote gas field)

IT 7440-02-0, Nickel, uses  
 RL: **CAT (Catalyst use); USES (Uses)**  
 (doped La<sub>2</sub>O<sub>3</sub>-promoted MgAl<sub>2</sub>O<sub>3</sub>, FT catalyst; integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for GTL in remote gas field)

IT 7440-06-4, Platinum, uses  
 RL: **CAT (Catalyst use); USES (Uses)**  
 (loaded with palladium on  $\gamma$ -alumina, methane oxidn. catalyst; integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for GTL in remote gas field)

IT 7440-05-3, Palladium, uses  
 RL: **CAT (Catalyst use); USES (Uses)**  
 (loaded with platinum on  $\gamma$ -alumina, methane oxidn. catalyst; integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for GTL in remote gas field)

IT 112510-19-7, Calcium lanthanum manganese oxide ( $\text{Ca}_{0.3}\text{La}_{0.7}\text{MnO}_3$ )  
 529487-74-9, Calcium iron lanthanum manganese oxide  
 ( $\text{Ca}_{0.3}\text{Fe}_{0.3}\text{La}_{0.7}\text{MnO}_3$ )  
 RL: **CAT (Catalyst use); USES (Uses)**  
 (methane oxidn. catalyst; integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for GTL in remote gas field)

IT 1312-81-8, Lanthanum oxide ( $\text{La}_2\text{O}_3$ )  
 RL: **CAT (Catalyst use); USES (Uses)**  
 (promoted MgAl<sub>2</sub>O<sub>3</sub>; integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for GTL in remote gas field)

IT 7440-45-1, Cerium, uses 7440-48-4, Cobalt, uses  
 RL: **CAT (Catalyst use); USES (Uses)**  
 (silica promoted with Ce/Co; integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for GTL in remote gas field)

IT 1344-28-1, Alumina, uses  
 RL: **CAT (Catalyst use); USES (Uses)**  
 ( $\gamma$ -, Pd-Pt loaded, support, methane oxidn. catalyst; integrated

GTL process of two-stage fixed bed syngas prodn. and F-T synthesis for  
in remote gas field)

L53 ANSWER 4 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
2003:170878 Document No. 138:371364 Electron-microscopy study  
multicomponent  
Ce/ $\theta$ -Al<sub>2</sub>O<sub>3</sub> oxide methane combustion catalysts. Komashko, L. V.;  
Zheksebaeva, Z. T.; Popova, N. M.; Dosumov, K. D. (Inst. Org.

Kataliza

Elektrokhim. im. D. V. Sokol'skogo, MON RK, Almaty, Kazakhstan).  
Izvestiya Ministerstva Obrazovaniya i Nauki Respubliki Kazakhstan,  
Natsional'noi Akademii Nauk Respubliki Kazakhstan, Seriya

Khimicheskaya

(6), 68-72 (Russian) 2002. CODEN: IMSKFR. ISSN: 1025-9341.

Publisher:

Nauchno-Izdatel'skii Tsentr "Glyym".

AB The morphol. and compn. of 2%**Ce**- modified  $\theta$ - Al<sub>2</sub>O<sub>3</sub>  
methane multicomponent combustion catalysts NiCuCr, MnBaSrCeLa after  
calcination to 1200 ° and **promoted** with traces of Pt  
(0.1-0.3%), **Pd** (0.05%), were studied with the aid of electron  
diffraction microscopy. The results are presented here. It was  
discovered that Mn-rare earth element-alk. earth element catalysts, in  
contrast to the NiCuCr contact, after high temp. processing in air, is  
organized into aluminite structures MeAl<sub>2</sub>O<sub>4</sub>, Me<sub>2</sub>Al<sub>2</sub>O<sub>7</sub>, and appears as  
manganese hexaaluminate like LaMnAl<sub>11</sub>O<sub>19</sub>. This catalyst is an active  
methane combustion catalyst.

IT 7440-05-3, Palladium, uses

RL: **CAT (Catalyst use); USES (Uses)**  
(metal **promoter** in Ce/ $\theta$ - Al<sub>2</sub>O<sub>3</sub>;  
electron-microscopy study of multicomponent Ce/ $\theta$ -  
Al<sub>2</sub>O<sub>3</sub> -metal oxide methane combustion catalysts)

RN 7440-05-3 CAPLUS

CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

CC 51-12 (Fossil Fuels, Derivatives, and Related Products)  
Section cross-reference(s): 67

IT Oxides (inorganic), uses  
Transition metal oxides

RL: **CAT (Catalyst use); USES (Uses)**  
(phases in calcined catalyst; electron-microscopy study of

Henderson

multicomponent Ce/0-Al<sub>2</sub>O<sub>3</sub> -metal oxide methane combustion catalysts)

IT 7439-91-0, Lanthanum, uses 7439-96-5, Manganese, uses 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-24-6, Strontium, uses 7440-39-3, Barium, uses 7440-47-3, Chromium, uses 7440-50-8, Copper, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (metal promoter in Ce/0- Al<sub>2</sub>O<sub>3</sub>;  
 electron-microscopy study of multicomponent Ce/0- Al<sub>2</sub>O<sub>3</sub> -metal oxide methane combustion catalysts)

IT 12014-44-7, Cerium aluminate (CeAlO<sub>3</sub>)  
 RL: CAT (Catalyst use); USES (Uses)  
 (phase in calcined catalyst, phase in calcined catalyst, phase in calcined catalyst; electron-microscopy study of multicomponent Ce/0-Al<sub>2</sub>O<sub>3</sub> -metal oxide methane combustion catalysts)

IT 522613-37-2, Aluminum lithium manganese oxide (Al<sub>11</sub>LiMnO<sub>19</sub>)  
 RL: CAT (Catalyst use); USES (Uses)  
 (phase in calcined catalyst, phase in calcined catalyst; electron-microscopy study of multicomponent Ce/0-Al<sub>2</sub>O<sub>3</sub> -metal oxide methane combustion catalysts)

IT 1304-28-5, Barium oxide, uses 1306-38-3, Cerium dioxide (CeO<sub>2</sub>), uses 1308-38-9, Chromium oxide (Cr<sub>2</sub>O<sub>3</sub>), uses 1313-13-9, Manganese dioxide (MnO<sub>2</sub>), uses 1314-06-3, Nickel oxide (Ni<sub>2</sub>O<sub>3</sub>) 1314-08-5, Palladium oxide (PdO) 1314-11-0, Strontium oxide, uses 1317-34-6, Manganese oxide (Mn<sub>2</sub>O<sub>3</sub>) 1317-35-7, Manganese oxide (Mn<sub>3</sub>O<sub>4</sub>) 1317-38-0, Copper oxide (CuO), uses 1317-39-1, Copper oxide (Cu<sub>2</sub>O), uses 1333-82-0, Chromium oxide (Cr<sub>2</sub>O<sub>3</sub>) 1345-13-7, Cerium oxide (Ce<sub>2</sub>O<sub>3</sub>) 7787-35-1, Barium manganese oxide (BaMnO<sub>4</sub>) 7787-36-2, Barium manganate (Ba(MnO<sub>4</sub>)<sub>2</sub>)  
 12003-21-3, AlCu 12003-65-5, Aluminum lanthanum oxide (AlLaO<sub>3</sub>)  
 12004-35-2, Nickel aluminum oxide (NiAl<sub>2</sub>O<sub>4</sub>) 12018-01-8, Chromium oxide (CrO<sub>2</sub>) 12018-18-7, Nickel chromium oxide (NiCr<sub>2</sub>O<sub>4</sub>) 12035-82-4, Platinum oxide (PtO) 12042-92-1, Aluminum copper oxide (Al<sub>2</sub>CuO<sub>4</sub>) 12068-52-9, Aluminum manganese oxide (MnAl<sub>2</sub>O<sub>4</sub>) 12142-67-5, LaPt 12163-45-0, Manganese strontium oxide (SrMnO<sub>3</sub>) 12209-30-2, Manganese nickel oxide (MnNiO<sub>3</sub>) 12250-93-0, Copper aluminum oxide (CuAlO<sub>2</sub>) 12254-24-9, Aluminum strontium oxide (Al<sub>12</sub>SrO<sub>19</sub>) 12359-17-0, Nickel oxide (Ni<sub>2</sub>O) 12394-76-2, Chromium nickel oxide (CrNiO<sub>3</sub>)  
 13548-42-0,  
 Chromium Copper oxide (CrCuO<sub>4</sub>) 14721-18-7 39354-08-0, Nickel aluminate  
 53169-13-4, Aluminum manganese oxide (AlMn<sub>2</sub>O<sub>4</sub>) 522613-26-9, Aluminum copper oxide (AlCuO<sub>4</sub>) 522613-28-1, Aluminum nickel oxide (Al<sub>2</sub>NiO<sub>4</sub>) 522613-29-2, Aluminum nickel oxide (Al<sub>2</sub>NiO<sub>3</sub>) 522613-30-5, Chromium

copper manganese oxide ( $\text{Cr}_{1.7}\text{CuMn}_0.904$ ) 522613-31-6, Aluminum manganese oxide ( $\text{AlMnO}_4$ ) 522613-32-7, Aluminum nickel oxide ( $\text{Al}_{12}\text{NiO}_49$ ) 522613-33-8, Aluminum manganese oxide ( $\text{AlMnO}_3$ ) 522613-35-0, Manganese nickel oxide ( $\text{MnNiO}_4$ ) 522613-39-4, Barium manganese oxide ( $\text{BaMn}_2\text{O}_4$ )  
RL: **CAT (Catalyst use); USES (Uses)**  
(phase in calcined catalyst; electron-microscopy study of multicomponent  $\text{Ce}/\theta\text{-Al}_2\text{O}_3$  -metal oxide methane combustion catalysts)  
IT 1344-70-3, Copper oxide 11099-02-8, Nickel oxide 11118-57-3,  
Chromium oxide 11129-18-3, Cerium oxide 39427-01-5, Copper aluminate  
RL: **CAT (Catalyst use); USES (Uses)**  
(phases in calcined catalyst; electron-microscopy study of multicomponent  $\text{Ce}/\theta\text{-Al}_2\text{O}_3$  -metal oxide methane combustion catalysts)  
IT 1344-28-1, Aluminum oxide ( $\text{Al}_2\text{O}_3$ ), uses  
RL: **CAT (Catalyst use); USES (Uses)**  
( $\theta$ -, modified with Ce; electron-microscopy study of multicomponent  $\text{Ce}/\theta\text{-Al}_2\text{O}_3$  -metal oxide methane combustion catalysts)  
IT 7440-45-1, Cerium, uses  
RL: **CAT (Catalyst use); USES (Uses)**  
( $\theta\text{-Al}_2\text{O}_3$ - modified with; electron-microscopy study of multicomponent  $\text{Ce}/\theta\text{-Al}_2\text{O}_3$  -metal oxide methane combustion catalysts)

L53 ANSWER 5 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
2002:868815 Document No. 137:372377 High surface area, small crystallite size catalyst for **Fischer-Tropsch** synthesis. Hu, X.  
D.; Loi, Patrick J.; O'Brien, Robert J. (Sud-Chemie, Inc., USA). PCT  
Int.  
Appl. WO 2002089978 A1 20021114, 49 pp. DESIGNATED STATES: W: AE,  
AG,  
AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ,  
DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL,  
IN,  
IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG,  
MK,  
MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK,  
SL,  
TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY,  
KG,

KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE,  
DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN,  
TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2002-US14095  
20020506. PRIORITY: US 2001-851177 20010508.

AB The present development is a transition metal-based catalyst having a  
high surface area, a smooth, homogeneous surface morphol., an essentially  
uniform distribution of cobalt throughout the support, and a small  
metal crystallite size. The high surface area transition metal-based  
catalysts of the present invention are prep'd. in a non-acidic soln. at a pH  
greater than .apprx.7.0, and starting with a non-acidic transition metal  
complex. The resulting product is a catalyst with a uniform distribution of  
metal throughout the catalyst particles, with a smooth and homogeneous  
surface morphol., and with slow crystallite growth upon heating.

IT 1344-28-1, Alumina, uses  
RL: CAT (Catalyst use); USES (Uses)  
(catalyst support; high surface area, small crystallite size  
catalyst for Fischer-Tropsch synthesis)

RN 1344-28-1 CAPLUS  
CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT 7440-05-3, Palladium, uses 7440-18-8, Ruthenium, uses  
RL: CAT (Catalyst use); USES (Uses)  
(high surface area, small crystallite size catalyst for Fischer  
-Tropsch synthesis)

RN 7440-05-3 CAPLUS  
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

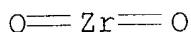
RN 7440-18-8 CAPLUS  
CN Ruthenium (8CI, 9CI) (CA INDEX NAME)

Henderson

Ru

IT 1314-23-4, Zirconium oxide, uses 7440-45-1,  
Cerium, uses  
RL: CAT (Catalyst use); USES (Uses)  
(promoter; high surface area, small crystallite size catalyst  
for Fischer-Tropsch synthesis)

RN 1314-23-4 CAPLUS  
CN Zirconium oxide (ZrO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



RN 7440-45-1 CAPLUS  
CN Cerium (8CI, 9CI) (CA INDEX NAME)

Ce

IC ICM B01J029-06  
ICS B01J029-064; B01J029-068; B01J029-072; B01J029-076; B01J021-02;  
B01J021-04; B01J021-06; B01J021-10; B01J021-12; B01J023-02;  
B01J023-04; B01J023-06; B01J023-10; B01J023-12; B01J023-16;  
B01J023-22; B01J023-24; B01J023-26; B01J023-28

CC 51-11 (Fossil Fuels, Derivatives, and Related Products)  
Section cross-reference(s): 67

ST Fischer Tropsch catalyst transition metal complex

IT Clays, uses  
RL: CAT (Catalyst use); USES (Uses)  
(attapulgitic, catalyst support; high surface area, small  
crystallite  
size catalyst for Fischer-Tropsch synthesis)

IT Clays, uses  
Diatomite  
Silicalites (zeolites)  
Silicates, uses  
Y zeolites  
Zeolites (synthetic), uses  
RL: CAT (Catalyst use); USES (Uses)  
(catalyst support; high surface area, small crystallite size  
catalyst

Henderson

for Fischer-Tropsch synthesis)

IT Fischer-Tropsch catalysts

Fischer-Tropsch reaction  
(high surface area, small crystallite size catalyst for Fischer-Tropsch synthesis)

IT Transition metal complexes

Transition metals, uses

RL: CAT (Catalyst use); USES (Uses)  
(high surface area, small crystallite size catalyst for Fischer-Tropsch synthesis)

IT Rare earth metals, uses

RL: CAT (Catalyst use); USES (Uses)  
(promoter; high surface area, small crystallite size catalyst for Fischer-Tropsch synthesis)

IT 1313-96-8, Niobia 1314-13-2, Zinc oxide, uses 1314-20-1, Thoria, uses  
1343-88-0, Magnesium silicate 1344-28-1, Alumina, uses  
7631-86-9, Silica, uses 12173-98-7, Mordenite 12304-65-3,

Hydrotalcite  
21645-51-2, Alumina trihydrate, uses 24623-77-6, Alumina monohydrate  
159995-97-8, Aluminum silicon oxide

RL: CAT (Catalyst use); USES (Uses)  
(catalyst support; high surface area, small crystallite size catalyst  
for Fischer-Tropsch synthesis)

IT 60-00-4D, Ethylenedinitrilo tetraacetic acid, complexes with cobalt (II)  
71-50-1D, Acetate, complexes with cobalt (II) 107-15-3D,  
1,2-Diaminoethane, complexes with cobalt (II) 110-86-1D, Pyridine,  
complexes with cobalt (II) 111-40-0D, Diethylenetriamine, complexes  
with cobalt (II) 112-24-3D, complexes with cobalt (II) 123-54-6D,  
2,4-Pentanedione, complexes with cobalt (II) 144-62-7D, Oxalic acid,  
complexes with cobalt (II) 603-35-0D, Triphenylphosphine, complexes  
with cobalt (II) 1314-68-7D, Rhenium (VII) oxide, complexes with cobalt  
(II) 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7439-98-7,  
Molybdenum, uses 7440-02-0, Nickel, uses 7440-04-2, Osmium, uses 7440-05-3  
, Palladium, uses 7440-06-4, Platinum, uses 7440-15-5, Rhenium,  
uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses 7440-33-7,  
Tungsten, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses  
7440-50-8, Copper, uses 7440-62-2, Vanadium, uses 7440-66-6, Zinc,

uses 7664-41-7D, Ammonia, complexes with cobalt (II) 7732-18-5D, Water, complexes with cobalt (II) 12648-47-4D, Platinum chloride, complexes with cobalt (II) 13933-32-9D, complexes with cobalt (II) 16887-00-6D, Chloride ion, complexes with cobalt (II) 20634-12-2D, complexes with cobalt (II) 22541-53-3D, complexes, uses  
34513-98-9D,  
Ruthenium nitrosyl nitrate, complexes with cobalt (II) 93687-50-4,  
Hexaammine cobalt carbonate  
RL: **CAT (Catalyst use); USES (Uses)**  
(high surface area, small crystallite size catalyst for **Fischer-Tropsch synthesis**)  
IT 1309-48-4, Magnesium oxide, uses 1313-59-3, Sodium oxide, uses  
**1314-23-4**, Zirconium oxide, uses 7429-91-6, Dysprosium, uses  
7439-91-0, Lanthanum, uses 7439-94-3, Lutetium, uses 7439-96-5,  
Manganese, uses 7440-00-8, Neodymium, uses 7440-09-7, Potassium,  
uses  
7440-10-0, Praseodymium, uses 7440-12-2, Promethium, uses  
7440-19-9,  
Samarium, uses 7440-20-2, Scandium, uses 7440-24-6, Strontium,  
uses  
7440-27-9, Terbium, uses 7440-30-4, Thulium, uses 7440-42-8,  
Boron,  
uses **7440-45-1**, Cerium, uses 7440-46-2, Cesium, uses  
7440-52-0, Erbium, uses 7440-53-1, Europium, uses 7440-54-2,  
Gadolinium, uses 7440-60-0, Holmium, uses 7440-64-4, Ytterbium,  
uses  
7440-65-5, Yttrium, uses 12136-45-7, Potassium oxide, uses  
13463-67-7,  
Titanium oxide, uses 18088-11-4, Rubidium oxide 20281-00-9, Cesium  
oxide  
RL: **CAT (Catalyst use); USES (Uses)**  
(promoter; high surface area, small crystallite size catalyst  
for **Fischer-Tropsch synthesis**)

L53 ANSWER 6 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
2002:725766 Document No. 137:219316 Preparation of **Fischer-Tropsch catalysts**. Zennaro, Roberto; Pederzani, Giovanni; Bellussi, Giuseppe (Enitecnologie S.p.A., Italy). Ital. Appl. IT 2000MI1167 A1 20011126, 30 pp. (Italian). CODEN: ITXXCZ.

APPLICATION:

IT 2000-MI1167 20000526.

AB A procedure for prepn. of **Fischer-Tropsch catalysts**  
involves (1) prepn. of a catalyst precursor contg. 1 or more Group  
VIII metal(s) in form of oxides supported on inert supports (e.g., SiO<sub>2</sub>,

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Al<sub>2</sub>O<sub>3</sub>), (2) redn. of the oxides from the step 1 to obtain the catalyst contg. 1 or more Group VIII metal(s) on the inert support, and (3) impregnation of the catalyst from the step 2 for re-oxidn. prevention

by treatment with a hydrocarbon fraction b. 30-130° (preferably 60-100°) and contg. S <5, Cl <5, and N <5 ppm in a liq. state and successive solidification at 20-25°. Preferably, C<sub>20</sub>-40 alkanes are used as the hydrocarbon fraction. The Group VIII metals contain ≥80% Co.

IT 7440-18-8, Ruthenium, uses 7440-45-1, Cerium,  
uses

RL: CAT (Catalyst use); MOA (Modifier or additive use); USES (Uses)

(promoter in prepn. of cobalt-based Fischer-Tropsch catalysts)

RN 7440-18-8 CAPLUS

CN Ruthenium (8CI, 9CI) (CA INDEX NAME)

Ru

RN 7440-45-1 CAPLUS

CN Cerium (8CI, 9CI) (CA INDEX NAME)

Ce

IT 1344-28-1, Alumina, uses

RL: CAT (Catalyst use); TEM (Technical or engineered material use); USES (Uses)

(support in prepn. of Fischer-Tropsch catalysts)

RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IC ICM C07C

CC 51-9 (Fossil Fuels, Derivatives, and Related Products)

Section cross-reference(s): 67

ST Fischer Tropsch catalyst prepn paraffin wax  
impregnation

IT Alkanes, uses

RL: TEM (Technical or engineered material use); USES (Uses)  
(C<sub>20</sub>-40; in impregnation of Fischer-Tropsch

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catalysts)

IT Paraffin waxes, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (in impregnation of **Fischer-Tropsch** catalysts)

IT Group VIII elements  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (in prepn. of **Fischer-Tropsch** catalysts)

IT **Fischer-Tropsch** catalysts  
 (prepn. of)

IT Rare earth metals, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (promoter in prepn. of cobalt-based **Fischer-Tropsch** catalysts)

IT 7440-48-4, Cobalt, uses  
 RL: CAT (Catalyst use); TEM (Technical or engineered material use); USES (Uses)  
 (in prepn. of **Fischer-Tropsch** catalysts)

IT 7439-91-0, Lanthanum, uses 7439-95-4, Magnesium, uses 7439-96-5,  
 Manganese, uses 7439-98-7, Molybdenum, uses 7440-09-7, Potassium,  
 uses 7440-15-5, Rhenium, uses 7440-18-8, Ruthenium, uses 7440-21-3,  
 Silicon, uses 7440-23-5, Sodium, uses 7440-24-6, Strontium, uses  
 7440-25-7, Tantalum, uses 7440-29-1, Thorium, uses 7440-31-5, Tin,  
 uses 7440-33-7, Tungsten, uses 7440-39-3, Barium, uses  
**7440-45-1**, Cerium, uses 7440-50-8, Copper, uses  
 7440-58-6, Hafnium, uses 7440-61-1, Uranium, uses 7440-66-6, Zinc,  
 uses 7440-67-7, Zirconium, uses 7440-70-2, Calcium, uses  
 RL: CAT (Catalyst use); MOA (Modifier or additive use); USES (Uses)  
 (promoter in prepn. of cobalt-based **Fischer-Tropsch** catalysts)

IT 1344-28-1, Alumina, uses 7631-86-9, Silica, uses  
 RL: CAT (Catalyst use); TEM (Technical or engineered material use); USES (Uses)  
 (support in prepn. of **Fischer-Tropsch** catalysts)

L53 ANSWER 7 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
 2002:461818 Document No. 137:371654 Modification of catalytic  
 properties of  
 Pd/Al<sub>2</sub>O<sub>3</sub> by rare earth addition: Catalytic activity and selectivity in  
 methanol decomposition. Cheng, Yang; Ren, Jie; Sun, Yuhan (State  
 Key Laboratory of Coal Conversion, Institute of Coal Chemistry,  
 Chinese  
 Academy of Sciences, Taiyuan, 030001, Peop. Rep. China). Zhongguo  
 Xitu

Xuebao, 20(2), 176-178 (Chinese) (2002) *Not PA* CODEN: ZXXUE5. ISSN:  
1000-4343.

Publisher: Yejin Gongye Chubanshe.

AB A series of **Pd** catalyst supported by CeO<sub>2</sub>-and La<sub>2</sub>O<sub>3</sub>- modified γ- **Al<sub>2</sub>O<sub>3</sub>** was prepd. for **methanol** decompn. The catalytic properties were investigated and the effect of the following parameters was addressed: (1) Precursor salt of **Pd** (chloride or nitrate). (2) Rare earth nature (La and/or **Ce**). (3) Rare earth content (0 .apprx. 30%). (4) Impregnation mode (successive impregnations or co-impregnation). A synergistic effect between CeO<sub>2</sub> and La<sub>2</sub>O<sub>3</sub> on γ- **Al<sub>2</sub>O<sub>3</sub>** is obsd. for promoting the catalytic properties of **Pd**, which results in high activity and selectivity for **methanol** decompn. into CO and H<sub>2</sub>. For a **methanol** LHSV of 1.8 h<sup>-1</sup>, at 250° **methanol** conversion reaches 91.4% with almost 100% selectivity of H<sub>2</sub> and CO.

IT 67-56-1, **Methanol**, processes

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)  
(modification of catalytic properties of Pd/Al<sub>2</sub>O<sub>3</sub> by rare earth

addn

for **methanol** decompn.)

RN 67-56-1 CAPLUS

CN Methanol (8CI, 9CI) (CA INDEX NAME)

H<sub>3</sub>C—OH

CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)  
Section cross-reference(s): 78

ST rare earth modification palladium alumina catalyst **methanol** decompn

IT Decomposition catalysts

(modification of catalytic properties of Pd/Al<sub>2</sub>O<sub>3</sub> by rare earth addn

for **methanol** decompn.)

IT 1306-38-3, Cerium dioxide, uses 1312-81-8, Lanthanum oxide  
7440-05-3,

Palladium, uses 10099-59-9, Lanthanum nitrate 10108-73-3, Cerium nitrate

RL: CAT (Catalyst use); USES (Uses)

(modification of catalytic properties of Pd/Al<sub>2</sub>O<sub>3</sub> by rare earth

addn

for **methanol** decompn.)

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- IT 67-56-1, **Methanol**, processes  
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)  
(modification of catalytic properties of Pd/Al<sub>2</sub>O<sub>3</sub> by rare earth addn  
for **methanol** decompn.)
- IT 1344-28-1, **Alumina**, uses  
RL: CAT (Catalyst use); USES (Uses)  
(γ; modification of catalytic properties of Pd/Al<sub>2</sub>O<sub>3</sub> by rare earth addn for **methanol** decompn.)
- L53 ANSWER 8 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
2002:312468 Document No. 137:22168 Promotion effects of CeO<sub>2</sub> and Pd on Ni/γ-Al<sub>2</sub>O<sub>3</sub> catalyst. Yang, Yong-Lai; Xu, Heng-Yong; Li, Wen-Zhao (Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian, 116023, Peop. Rep. China). Wuli Huaxue Xuebao, 18(4), 321-325 (Chinese) 2002. CODEN: WHXUEU. ISSN: 1000-6818. Publisher: Beijing Daxue Chubanshe.
- AB The influence of the addn. of n-type semiconductor oxide CeO<sub>2</sub> and noble metal Pd to Ni/γ- Al<sub>2</sub>O<sub>3</sub> catalyst on carbon deposition by CH<sub>4</sub> and carbon elimination by CO<sub>2</sub> was studied by using a pulse micro-reaction as well as BET, TPR, CO<sub>2</sub>-TPSR and hydrogen chemisorption techniques. It was found that, the addn. of n-type semiconductor CeO<sub>2</sub> to Ni/γ- Al<sub>2</sub>O<sub>3</sub> catalyst could decrease carbon deposition activity of CH<sub>4</sub> and increase carbon elimination ability of CO<sub>2</sub>; the addn. of noble metal Pd could further alter the interaction between support Al<sub>2</sub>O<sub>3</sub>, promoter CeO<sub>2</sub> and active phase Ni, as a result, the performance of resistance to carbon deposition of Ni/γ- Al<sub>2</sub>O<sub>3</sub> catalyst was improved. At the same time, a new explanation for the above promoting effect was put forward by the models of carbon deposition by CH<sub>4</sub> and carbon elimination by CO<sub>2</sub> on the Ni-Ce-Pd/γ-Al<sub>2</sub>O<sub>3</sub> catalyst.
- CC 51-11 (Fossil Fuels, Derivatives, and Related Products)  
Section cross-reference(s): 67
- ST cerium oxide palladium nickel alumina methane reforming catalyst
- IT Reforming catalysts  
(promotion effects of CeO<sub>2</sub> and Pd on Ni/γ-Al<sub>2</sub>O<sub>3</sub> catalyst)
- IT 1306-38-3, Cerium oxide (CeO<sub>2</sub>), uses 1344-28-1, **Alumina**, uses 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses  
RL: CAT (Catalyst use); USES (Uses)  
(promotion effects of CeO<sub>2</sub> and Pd on Ni/γ-Al<sub>2</sub>O<sub>3</sub> catalyst)

L53 ANSWER 9 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
2002:160316 Document No. 136:206040 Catalysts showing high thermal conductivity and their manufacture. Shiizaki, Shinji; Nagashima, Ikuo;  
Kameyama, Hideo (Kawasaki Heavy Industries, Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2002066337 A2 20020305, 9 pp. (Japanese). CODEN: JKXXAF.

APPLICATION: JP 2000-262454 20000831.  
AB The substrate having an alumina layer, formed by anodization, is dipped in a soln. contg. weak acid or alkali and a catalyst for enlargement of the alumina pore diam. and for deposition of the catalysts in the pores and then treated for removal of the alumina layer to obtain a catalyst layer.

Enlargement of alumina **pore size** may be carried out by treatment with alkali or acid. A support substance may be added to the above stated dipping soln., instead of the catalysts, for formation of a support layer on the substrate, followed by application of catalyst metals thereon. Thus prep'd. catalysts are also claimed. Heat transfer in catalytic processes are carried out under high efficiency. The catalysts are suitable for use in endo- or exothermic catalytic reactions.

IT 1314-13-2, Zinc oxide, uses  
RL: CAT (Catalyst use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses) (catalyst support; formation of catalyst layers on thermal conductors

by using anodized alumina layers)

RN 1314-13-2 CAPLUS

CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O==Zn

IT 7440-05-3, Palladium, uses  
RL: CAT (Catalyst use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses) (catalyst; formation of catalyst layers on thermal conductors by using

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anodized alumina layers)  
RN 7440-05-3 CAPLUS  
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

IT 67-56-1, Methanol, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(decompn. of; formation of catalyst layers on thermal conductors by  
using anodized alumina layers)  
RN 67-56-1 CAPLUS  
CN Methanol (8CI, 9CI) (CA INDEX NAME)

H<sub>3</sub>C—OH

IC ICM B01J037-00  
ICS B01J023-44; B01J037-02; C25D011-18; C25D011-24  
CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)  
Section cross-reference(s): 51  
IT Zeolites (synthetic), uses  
RL: CAT (Catalyst use); PEP (Physical, engineering or chemical  
process); PYP (Physical process); PROC (Process); USES (Uses)  
(catalyst support; formation of catalyst layers on thermal  
conductors  
by using anodized alumina layers)  
IT Anodization  
Catalysts  
Heat transfer  
Reforming catalysts  
Thermal conductors  
(formation of catalyst layers on thermal conductors by using  
anodized  
alumina layers)  
IT 1302-88-1, Cordierite 1306-38-3, Ceria, uses 1309-48-4, Magnesium  
oxide, uses 1314-13-2, Zinc oxide, uses 1314-23-4, Zirconia,  
uses 1332-29-2, Tin oxide 1332-37-2, Iron oxide, uses 7631-86-9,  
Silica, uses 11098-99-0, Molybdenum oxide 11099-11-9, Vanadium  
oxide  
11118-57-3, Chromium oxide 13463-67-7, Titania, uses  
RL: CAT (Catalyst use); PEP (Physical, engineering or chemical  
process); PYP (Physical process); PROC (Process); USES (Uses)

Henderson

(catalyst support; formation of catalyst layers on thermal conductors  
by using anodized alumina layers)  
IT 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7439-96-5,  
Manganese,  
uses 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses  
7440-06-4, Platinum, uses 7440-15-5, Rhenium, uses 7440-16-6,  
Rhodium,  
uses 7440-18-8, Ruthenium, uses 7440-22-4, Silver, uses  
7440-31-5,  
Tin, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses  
7440-57-5,  
Gold, uses 7440-66-6, Zinc, uses  
RL: CAT (Catalyst use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)  
(catalyst; formation of catalyst layers on thermal conductors by using  
anodized alumina layers)  
IT 67-56-1, Methanol, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(decompn. of; formation of catalyst layers on thermal conductors by using anodized alumina layers)  
IT 37321-70-3, A1050  
RL: CAT (Catalyst use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)  
(formation of catalyst layers on thermal conductors by using anodized  
alumina layers)

L53 ANSWER 10 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
2002:100383 Document No. 136:328065 Synergistic promotion of CeO<sub>2</sub> and La<sub>2</sub>O<sub>3</sub>  
in Pd/Al<sub>2</sub>O<sub>3</sub> catalysts for methanol decomposition. Yang, Cheng;  
Ren, Jie; Sun, Yuhua (State Key Laboratory of Coal Conversion,  
Institute  
of Coal Chemistry, Chinese Academy of Sciences, Taiyuan, 030001, Peop.  
Rep. China). Catalysis Communications, 2(11-12), 353-356 (English)  
2001.  
CODEN: CCAOAC. ISSN: 1566-7367. Publisher: Elsevier Science B.V..  
AB Pd catalysts supported on CeO<sub>2</sub>- and La<sub>2</sub>O<sub>3</sub>-modified γ-Al<sub>2</sub>O<sub>3</sub> were  
prepd. for MeOH decompn. to CO and H for fuel cell applications.  
The CeO<sub>2</sub> and La<sub>2</sub>O<sub>3</sub> promote the catalytic activity of the Pd catalysts  
for  
MeOH decompn.  
IT 67-56-1, Methanol, reactions

Henderson

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent) (activity of CeO<sub>2</sub>- and La<sub>2</sub>O<sub>3</sub>-promoted Pd/Al<sub>2</sub>O<sub>3</sub> catalysts for MeOH decompn. to fuel gases for fuel cell applications)

RN 67-56-1 CAPLUS  
 CN Methanol (8CI, 9CI) (CA INDEX NAME)

H<sub>3</sub>C— OH

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST cerium oxide promoted palladium catalyst **methanol** decompn;  
 lanthanum oxide promoted palladium catalyst **methanol** decompn;  
 fuel cell application **methanol** decompn catalyst  
 IT Decomposition catalysts  
 Fuel cells  
 Fuel gases  
 (activity of CeO<sub>2</sub>- and La<sub>2</sub>O<sub>3</sub>-promoted Pd/Al<sub>2</sub>O<sub>3</sub> catalysts for MeOH decompn. to fuel gases for fuel cell applications)  
 IT 1306-38-3, Cerium oxide, uses 1312-81-8, Lanthanum oxide  
 7440-05-3, Palladium, uses  
 RL: **CAT (Catalyst use); USES (Uses)**  
 (activity of CeO<sub>2</sub>- and La<sub>2</sub>O<sub>3</sub>-**promoted** Pd/  
 Al<sub>2</sub>O<sub>3</sub> catalysts for **MeOH** decompn. to fuel gases for  
 fuel cell applications)  
 IT 67-56-1, **Methanol**, reactions  
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent) (activity of CeO<sub>2</sub>- and La<sub>2</sub>O<sub>3</sub>-promoted Pd/Al<sub>2</sub>O<sub>3</sub> catalysts for MeOH decompn. to fuel gases for fuel cell applications)

L53 ANSWER 11 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
 2002:51892 Document No. 136:120909 Chromium-based mixed oxides as catalysts for converting C1-5-hydrocarbons to syngas. Kourtakis, Kostantinos; Gaffney, Anne M.; Wang, Lin (USA). U.S. Pat. Appl. Publ. US 2002006374 A1  
 20020117, 30 pp., Cont.-in-part of U.S. Ser. No. 703,701. (English). CODEN: USXXCO. APPLICATION: US 2001-785384 20010216. PRIORITY: US 1999-PV163843 19991105; US 2000-PV183423 20000218; US 2000-PV183575 20000218; US 2000-703701 20001101.  
 AB A chromium-based mixed oxide is used for the catalytic conversion of C1-5-hydrocarbons to carbon monoxide and hydrogen under partial oxidn. **promoting** conditions. The mixed oxide catalyst contains at least

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one other metal, such as Li, Na, K, Rb, Cs, Mg, Ca, Sr, Ba, Cu, Ag, Au, Zn, Cd, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Co, Ni, Ru, or Rh and has a structure other than perovskite. The catalyst can also contain magnesia, silica, titanium dioxide, tantalum oxide, zirconia or alumina as an oxidatively and thermally stable porous support in form of a three-dimensional monolith, reticulated ceramic, or ceramic foam, or for forming a xerogel or aerogel as a matrix (at least 30 wt.% of total wt.). These gels are prep'd. by reacting metal C1-4-alkoxides, such as tantalum n-butoxide, titanium isopropoxide, and zirconium isopropoxide, with water at a molar ratio of 1:0.1-10. The syngas prodn. process is carried out at 700-1,000°C, 130-10,000 kPa, and a space velocity of the reaction mixt. of 50,000-50,000,000 NL/kg/h with a catalyst contact time of ≤ 10 ms. The reactant gas mixt. has a C:O ratio of about 2:1 and contains at least 80 vol.% of methane.

IC ICM C01B031-18  
 ICS C01B003-26; B01J023-26  
 NCL 423418200  
 CC 51-11 (Fossil Fuels, Derivatives, and Related Products)  
 Section cross-reference(s): 67  
 IT Alkali metal oxides  
 Alkaline earth oxides  
 Rare earth oxides  
 Transition metal oxides  
 RL: **CAT (Catalyst use); USES (Uses)**  
 (mixed oxide catalyst contg.; chromium-based mixed oxides as catalysts  
 for converting C1-5 hydrocarbons to syngas)  
 IT 59165-25-2, Chromium Cobalt lanthanum oxide  
 RL: **CAT (Catalyst use); USES (Uses)**  
 (catalyst; chromium-based mixed oxides as catalysts for converting C1-5  
 hydrocarbons to syngas)  
 IT 11104-65-7P, Chromium copper oxide 12016-69-2P, Chromium cobalt  
 oxide (Cr<sub>2</sub>CoO<sub>4</sub>) 12619-67-9P, Chromium magnesium oxide 12640-79-8P,  
 Nickel tungsten oxide 12673-58-4P, Molybdenum Nickel oxide 12687-47-7P,  
 Chromium nickel oxide 12737-27-8P, Chromium iron oxide  
 12771-00-5P,

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Copper tungsten oxide 12777-94-5P, Chromium Lanthanum oxide  
13762-14-6P, Cobalt molybdenum oxide (CoMoO<sub>4</sub>) 39318-26-8P, Chromium  
vanadium oxide 39432-73-0P, Chromium manganese oxide 39455-56-6P,  
Chromium tungsten oxide 50922-29-7P, Chromium zinc oxide

51142-84-8P,

Copper Molybdenum oxide 51845-82-0P, Cerium chromium oxide  
56214-02-9P, Chromium samarium oxide 181790-65-8P, Chromium cobalt  
titanium oxide 200711-37-1P, Chromium lanthanum nickel oxide  
204759-73-9P, Chromium magnesium silicon oxide 356068-71-8P,

Aluminum

chromium gold oxide 356068-72-9P, Chromium gold magnesium oxide  
356068-74-1P, Chromium nickel yttrium oxide 356068-75-2P, Cerium  
chromium nickel oxide 356068-76-3P, Chromium magnesium hydroxide  
oxide

389964-31-2P, Chromium lanthanum lithium oxide

RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP

(Preparation); USES (Uses)

(catalyst; chromium-based mixed oxides as catalysts for converting

C1-5

hydrocarbons to syngas)

IT 1308-38-9P, Dichromium trioxide, uses

RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP  
(Preparation); USES (Uses)

(freeze-dried or aerogel, catalyst; chromium-based mixed oxides as  
catalysts for converting C1-5 hydrocarbons to syngas)

IT 546-68-9, Titanium isopropoxide 2171-98-4, Zirconium isopropoxide  
51094-78-1, 1-Butanol, tantalum(5+) salt

RL: CAT (Catalyst use); USES (Uses)

(gel formation using; chromium-based mixed oxides as catalysts for  
converting C1-5 hydrocarbons to syngas)

IT 1304-28-5, Barium oxide, uses 1305-78-8, Calcium oxide, uses  
1306-19-0, Cadmium oxide, uses 1308-87-8, Dysprosium oxide

1312-81-8,

Lanthanum oxide 1313-59-3, Sodium oxide, uses 1313-99-1, Nickel  
oxide,  
uses 1314-11-0, Strontium oxide, uses 1314-13-2, Zinc oxide, uses  
1344-70-3, Copper oxide 11104-61-3, Cobalt oxide 11113-84-1,

Ruthenium

oxide 11129-18-3, Cerium oxide 12036-32-7, Praseodymium oxide  
12057-24-8, Lithium oxide, uses 12061-16-4, Erbium oxide

12064-62-9,

Gadolinium oxide 12136-45-7, Potassium oxide, uses 12648-30-5,  
Neodymium oxide 12651-06-8, Samarium oxide 12651-43-3, Ytterbium

oxide

12680-36-3, Rhodium oxide 12738-76-0, Terbium oxide 12770-85-3,

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Europium oxide 18088-11-4, Rubidium oxide 20281-00-9, Cesium oxide 20667-12-3, Silver oxide 39403-39-9, Gold oxide 39455-61-3,  
Holmium oxide 39455-67-9, Lutetium oxide 39455-81-7, Thulium oxide  
RL: CAT (Catalyst use); USES (Uses)  
(mixed oxide contg.; chromium-based mixed oxides as catalysts for  
converting C1-5 hydrocarbons to syngas)

IT 1309-48-4, Magnesia, uses 1314-23-4, Zirconia, uses 1344-28-1,  
 $\alpha$ -Alumina, uses 7631-86-9, Silica, uses 13463-67-7, Titanium  
oxide, uses 59763-75-6, Tantalum oxide  
RL: CAT (Catalyst use); USES (Uses)  
(support; chromium-based mixed oxides as catalysts for converting  
C1-5 hydrocarbons to syngas)

L53 ANSWER 12 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
2001:651734 Document No. 135:359351 Effect of the promotion of ceria on  
Pd/MgO catalyst for methanol synthesis. Imamura, Seiichiro;  
Denpo, Katsuaki; Kanai, Hiroyoshi; Yamane, Hideyuki; Saito, Yoshio;

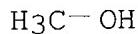
Utani,  
Kazunori; Matsumura, Yasuyuki (Faculty of Engineering and Design,  
Kyoto  
Institute of Technology, Kyoto, 606-8585, Japan). Sekiyu Gakkaishi,  
44(5), 293-302 (English) 2001. CODEN: SKGSAE. ISSN: 0582-4664.  
Publisher: Sekiyu Gakkai.

AB The hydrogenation of CO was carried out over Pd supported on  
MgO. The addn. of various lanthanide oxides increased the activity of  
Pd/MgO to produce methanol. CeO<sub>2</sub> exhibited the highest  
promoting effect at a temp. as low as of 250°C and the  
optimum molar ratio of Ce/Pd was about unity. TPR  
expt. showed that CeO<sub>2</sub> on MgO (without Pd) suffered less redn.  
with hydrogen compared with that supported on Al<sub>2</sub>O<sub>3</sub>. Thus, the  
former retained the Ce(IV) state almost completely under the  
reducing condition, which was ascertained by XAFS measurement. XAFS  
anal.

also indicated that Pd in Pd/MgO suffered redn.  
extensively while that in Pd/CeO<sub>2</sub>/MgO partly retained the  
oxidized state owing to the redn.-resistant CeO<sub>2</sub> on MgO. The results

of  
CO adsorption XPS, XAFS, and TEM measurement revealed that addn. of  
CeO<sub>2</sub>  
increased the dispersion of Pd metal particles. It was  
concluded that the high activity of the catalyst resulted from the  
combination of highly dispersed Pd metal and partly oxidized  
Pd component with a Pd-O bond.

IT 67-56-1P, **Methanol**, preparation  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (ceria promotion of Pd/MgO catalyst for **methanol** synthesis)  
 RN 67-56-1 CAPLUS  
 CN Methanol (8CI, 9CI) (CA INDEX NAME)



CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)  
 Section cross-reference(s): 52  
 ST carbon monoxide hydrogenation catalyst **methanol** prepn  
 IT 1306-38-3, Ceria, uses 7440-05-3, Palladium, uses  
 RL: **CAT (Catalyst use)**; USES (Uses)  
 (ceria promotion of Pd/MgO catalyst for **methanol** synthesis)  
 IT 630-08-0, Carbon monoxide, reactions  
 RL: PEP (Physical, engineering or chemical process); RCT (Reactant);  
 PROC (Process); RACT (Reactant or reagent)  
 (ceria promotion of Pd/MgO catalyst for **methanol** synthesis)  
 IT 67-56-1P, **Methanol**, preparation  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (ceria promotion of Pd/MgO catalyst for **methanol** synthesis)

L53 ANSWER 13 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
 2001:146953 Document No. 134:254455 **Methanol** decomposition to  
 synthesis gas at low temperature over palladium supported on  
 ceria-zirconia solid solutions. Liu, Y.; Hayakawa, T.; Ishii, T.;  
 Kumagai, M.; Yasuda, H.; Suzuki, K.; Hamakawa, S.; Murata, K.  
 (Chemical  
 Technology Division, Institute of Research and Innovation, Chiba,  
 Kashiwa,  
 Takada, Japan). Applied Catalysis, A: General, 210(1,2), 301-314  
 (English) 2001. CODEN: ACAGE4. ISSN: 0926-860X. Publisher: Elsevier  
 Science B.V..

AB The Ce<sub>x</sub>Zr<sub>1-x</sub>O<sub>2</sub> solid soln. was used as a support of a palladium  
 catalyst for **methanol** decompn. to synthesis gas at low temp.  
 All **Pd**-contg. catalysts tested in this study showed high  
 selectivity to synthesis gas (over 96%). The **Pd** supported on  
 the composite oxide with a Ce/Zr molar ratio of 4/1 exhibited  
 the highest activity. **Pd/Ce0.8Zr0.2O2** (17 wt. %) (Cop) (prep'd.  
 by copptn. method) showed a conversion of 51.2% for the **methanol**  
 decompn. at 473 K, which was higher than those over 17 wt. % **Pd**/  
**CeO<sub>2</sub>** (cop) (40.7%) and 17 wt. % **Pd/ZrO<sub>2</sub>** (cop)

(24.3%) at 473 K. The 17 wt. % Pd/Ce0.8Zr0.202 (cop) catalyst showed a higher BET surface area and smaller Pd particles than those of 17 wt. % Pd/CeO<sub>2</sub> (cop). Moreover, a more active Pd. $\sigma$ + state could be maintained by Zr<sup>4+</sup> ion modification due to promotion of the oxygen mobility and enhancement of the reducibility and increase in the acid sites of the CeO<sub>2</sub> support. The

17

wt.% Pd/Ce0.8Zr0.202 (cop) catalyst showed a much higher conversion (51.2%) than that over 17 wt. % Pd/Ce0.8Zr0.202 (imp) (prepd. by impregnation method) (17.2%) at 473 K. This is due to the

17 wt. % Pd/Ce0.8Zr0.202 (cop) possessing many small Pd particles. The 17 wt.% Pd/Ce0.8Zr0.202 (cop) catalyst showed an initial conversion of 51.2% at 473 K but the conversion decreased to

43.1%

after 24 h on stream. This deactivation was attributed to carbonaceous

deposit on the catalyst surface. The amts. of coke on the 17 wt. % Pd/Ce0.8Zr0.202 (cop) catalyst were 0.9 wt. % After 24 h on stream at 473 K and 2.1 wt. % After 1 h on stream at 523 K.

IT 67-56-1, Methanol, processes

RL: PEP (Physical, engineering or chemical process); PROC (Process) (methanol decompn. to synthesis gas at low temp. over palladium supported on ceria-zirconia solid solns.)

RN 67-56-1 CAPLUS

CN Methanol (8CI, 9CI) (CA INDEX NAME)

H<sub>3</sub>C—OH

CC 51-11 (Fossil Fuels, Derivatives, and Related Products)

ST methanol decompn catalysts palladium ceria zirconia syngas

IT Decomposition catalysts

Synthesis gas

(methanol decompn. to synthesis gas at low temp. over palladium supported on ceria-zirconia solid solns.)

IT 1306-38-3, Ceria, uses 1314-23-4, Zirconia, uses 7440-05-3, Palladium,  
uses

RL: CAT (Catalyst use); USES (Uses)

(methanol decompn. to synthesis gas at low temp. over palladium supported on ceria-zirconia solid solns.)

IT 67-56-1, Methanol, processes

RL: PEP (Physical, engineering or chemical process); PROC (Process)

Henderson

(methanol decompn. to synthesis gas at low temp. over palladium supported on ceria-zirconia solid solns.)

L53 ANSWER 14 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
2001:7599 Document No. 134:58950 Extended catalyst life in a two-stage  
**Fischer-Tropsch** hydrocarbon synthesis process. Beer,  
Gary L. (Syntroleum Corporation, USA). U.S. US 6169120 B1 20010102,  
5 pp.

(English). CODEN: USXXAM. APPLICATION: US 1999-397474 19990917.

AB An extended catalyst life two-stage hydrocarbon synthesis process is presented where a first synthesis gas stream is reacted in a first-stage

reactor in the presence of a suitable catalyst (e.g., Co/alumina) to produce liq. hydrocarbon products and a gaseous stream; the gaseous stream

is cooled and water and liq. hydrocarbons are sepd. from the gaseous stream to produce a second synthesis gas stream which is then passed to a

second stage reactor for the prodn. of addnl. liq. hydrocarbons.

IT 7440-18-8, Ruthenium, uses 7440-45-1, Cerium,  
uses

RL: CAT (Catalyst use); USES (Uses)  
(catalyst promoter; extended catalyst life in a two-stage  
**Fischer-Tropsch** hydrocarbon synthesis process using)

RN 7440-18-8 CAPLUS

CN Ruthenium (8CI, 9CI) (CA INDEX NAME)

Ru

RN 7440-45-1 CAPLUS

CN Cerium (8CI, 9CI) (CA INDEX NAME)

Ce

IT 1344-28-1, Alumina, uses

RL: CAT (Catalyst use); USES (Uses)  
(support; extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process)

RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

Henderson

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IC ICM C07C027-00

NCL 518715000

CC 51-9 (Fossil Fuels, Derivatives, and Related Products)  
Section cross-reference(s): 48, 67

ST **Fischer Tropsch** hydrocarbon manuf extended catalyst life

IT Reactors  
(column, slurry-bubble; extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process using)

IT **Fischer-Tropsch** catalysts  
Synthesis gas  
(extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process)

IT Hydrocarbons, preparation  
RL: IMF (Industrial manufacture); PREP (Preparation)  
(extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process)

IT **Fischer-Tropsch** reaction  
(hydrocarbon-synthesis process using a two-stage)

IT Columns and Towers  
(reactor, slurry-bubble; extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process using)

IT 7727-37-9, Nitrogen, uses  
RL: NUU (Other use, unclassified); USES (Uses)  
(carrier; extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process using)

IT 7440-15-5, Rhenium, uses 7440-18-8, Ruthenium, uses 7440-32-6,  
Titanium, uses 7440-45-1, Cerium, uses 7440-58-6,  
Hafnium, uses 7440-61-1, Uranium, uses 7440-67-7, Zirconium, uses  
RL: CAT (Catalyst use); USES (Uses)  
(catalyst promoter; extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process using)

IT 7440-48-4, Cobalt, uses  
RL: CAT (Catalyst use); USES (Uses)  
(extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process)

IT 630-08-0, Carbon monoxide, reactions 1333-74-0, Hydrogen, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process)

IT 1344-28-1, Alumina, uses  
RL: CAT (Catalyst use); USES (Uses)  
(support; extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process)

L53 ANSWER 15 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
2000:899081 Document No. 134:193065 Influence of Mg and Ce addition to ruthenium based catalysts used in the selective hydrogenation of  $\alpha,\beta$ -unsaturated aldehydes. Bachiller-Baeza, B.; Rodriguez-Ramos, I.; Guerrero-Ruiz, A. (C.S.I.C. Campus de Cantoblanco, Instituto de Catalisis y Petroleoquimica, Madrid, 28049, Spain). Applied Catalysis, A: General, 205(1,2), 227-237 (English) 2001. CODEN: ACAGE4. ISSN: 0926-860X. OTHER SOURCES: CASREACT 134:193065. Publisher: Elsevier Science B.V..

AB Ce and Mg were used as **promoters** in two series of Ru based catalysts supported on **alumina (Al<sub>2</sub>O<sub>3</sub>)** and activated carbon (AC). The catalysts were characterized by H<sub>2</sub> chemisorption and temp.-programmed redn. (TPR), and studied in the crotonaldehyde (gas phase) and the citral (liq. phase) hydrogenations. Addn. of MgO and CeO<sub>2</sub> decreased the catalytic activity in crotonaldehyde and citral hydrogenations. With regard to the selectivity towards unsatd. **alcs.**, similar trends were obsd. for the two reactions. MgO did not influence the selectivity, but CeO<sub>2</sub> increased the selectivity to unsatd. **alcs.**, esp. on carbon supported catalyst. Bulk CeO<sub>2</sub> and Ce/AC catalyst showed low activity but very high selectivity (93 and 100%, resp.) to the unsatd. **alcs.**. Based on these results and the calorimetric expts. of CO adsorption it was suggested that defect sites on the surface of the **promoter** are the active and highly selective sites for unsatd. aldehydes due to their influence on the C:O bond activation.

CC 22-7 (Physical Organic Chemistry)  
Section cross-reference(s): 30

IT 1306-38-3, Cerium dioxide, uses 1309-48-4, Magnesium oxide, uses 7440-18-8, Ruthenium, uses

RL: **CAT (Catalyst use); USES (Uses)**  
(catalysts in selective hydrogenation of  $\alpha,\beta$ -unsatd. aldehydes)

IT 6117-91-5P, Crotyl alcohol  
RL: **SPN (Synthetic preparation); PREP (Preparation)**  
(catalysts in selective hydrogenation of  $\alpha,\beta$ -unsatd. aldehydes)

L53 ANSWER 16 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
1999:210576 Document No. 130:314085 Modification of the catalytic properties

of palladium by rare earth (La, Ce) addition, catalytic activity and selectivity in hydrocarbon conversion. Kili, K.; Le Normand, F. (Laboratoire d'Etudes de la Ractiuiti Catalytique des Surfaces et Interfaces (LERCSI), UMR CNRS-ULP-ECPM, Strasbourg, 67070, Fr.).

Journal

of Molecular Catalysis A: Chemical, 140(3), 267-285 (English) 1999.  
CODEN: JMCCF2. ISSN: 1381-1169. Publisher: Elsevier Science B.V..

AB Pd/Al<sub>2</sub>O<sub>3</sub> catalysts modified by cerium or lanthanum promoters are tested for hydrocarbon conversion: methylcyclopentane (MCP) hydrogenolysis, 2-methylpentane (2MP) isomerization and 3-methylhexane (3MH) hydrocracking, dehydrocyclization

and aromatization. The following parameters are reviewed: (i) precursor

salt of palladium (chloride or nitrate), (ii) rare earth nature (La or Ce), (iii) rare earth content within the range 0-100% and (iv) impregnation mode (coimpregnation or successive impregnations).

The

influence of chloride coming from the precursor salt of palladium on the catalytic behavior is strongly underlined. Chlorine anions are trapped by rare earth cations at the interface, as evidenced in a subsequent paper dealing with characterization studies of these same catalysts. Although the reactions readily occur on metallic sites, as evidenced by <sup>13</sup>C labeled expts., the addn. of rare earth increases the activity and modifies the selectivity, esp. for 2MP isomerization.

These

changes are rationalized in terms of significant modification of the kinetic surface parameters (competitive hydrogen and hydrocarbon coverages). This is explained by (i) lowering of the hydrogen coverage of

the palladium sites accompanying surface diffusion on the interface with the support and (ii) creation of new selective sites at the

transition metal-rare earth interface. The other parameters investigated

yield only minor changes of the catalytic behavior.

CC 51-6 (Fossil Fuels, Derivatives, and Related Products)

Section cross-reference(s): 67

ST petroleum reforming catalyst palladium cerium lanthanum

IT Aromatization catalysts

Hydrocracking catalysts

Henderson

Hydrogenolysis catalysts  
 Isomerization catalysts  
 Petroleum **reforming** catalysts  
     (modification of the catalytic properties of palladium by rare earth  
         (La, Ce) addn., catalytic activity and selectivity in hydrocarbon conversion)  
 IT 7439-91-0, Lanthanum, uses 7440-05-3, Palladium, uses 7440-45-1,  
     Cerium, uses  
     RL: **CAT (Catalyst use); USES (Uses)**  
         (modification of the catalytic properties of palladium by rare earth  
         (La, Ce) addn., catalytic activity and selectivity in hydrocarbon conversion)

L53 ANSWER 17 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
 1998:633231 Document No. 129:318254 Ruthenium catalysts for high temperature  
     solar **reforming** of methane. Berman, A.; Epstein, M. (Solar Research Facilities Unit, Weizmann Institute of Science, Israel).  
     Hydrogen Power: Theoretical and Engineering Solutions, Proceedings of  
     the  
     HYPOTHESIS Symposium, 2nd, Grimstad, Norway, Aug. 18-22, 1997, Meeting Date 1997, 213-218. Editor(s): Saetre, T. O. Kluwer: Dordrecht, Neth.  
     (English) 1998. CODEN: 66STAR.

AB The **reforming** of CH<sub>4</sub> with CO<sub>2</sub> on Ru/**Al<sub>2</sub>O<sub>3</sub>** catalysts **promoted** with ceria is described. Effects of Ce on the activity and thermal stability of the catalysts were studied. Data for unpromoted Ru catalysts are given for comparison. The active centers of the **promoted** Ru-Ce catalyst supported on **alumina** have a dynamic structure which can be changed in the course of the reaction.

CC 49-1 (Industrial Inorganic Chemicals)  
 Section cross-reference(s): 51, 52, 67

ST solar **reforming** methane ruthenium catalyst

IT Reforming  
     **Reforming** catalysts  
     Solar energy  
         (ruthenium catalysts for high temp. solar **reforming** of methane)

IT 1344-28-1, Alumina, uses 7440-18-8, Ruthenium, uses  
     RL: **CAT (Catalyst use); USES (Uses)**  
         (ruthenium catalysts for high temp. solar **reforming** of methane)

IT 1306-38-3, Ceria, uses  
RL: CAT (Catalyst use); MOA (Modifier or additive use); USES (Uses)  
(ruthenium catalysts for high temp. solar reforming of methane)  
IT 74-82-8, Methane, reactions 124-38-9, Carbon dioxide, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(ruthenium catalysts for high temp. solar reforming of methane)  
IT 1333-74-0P, Hydrogen, preparation  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(ruthenium catalysts for high temp. solar reforming of methane)

L53 ANSWER 18 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
1998:297866 Document No. 129:31593 Method for catalytic purification of combustion waste gases using ethanol with complete reaction.  
Saito, Mika; Aoyama, Naoko; Yoshida, Kiyohide; Feng, Kei Sai (Tsusho Sangyosho Kiso Sangyo Kyoku, Japan). Jpn. Kokai Tokkyo Koho JP

10118459 A2 19980512 Heisei, 7 pp. (Japanese). CODEN: JKXXAF. APPLICATION:

JP 1996-295880 19961018.

AB The method is carried out by arranging gas purifying agent along the exhaust gas passage, which comprises a 1st silver-contg. catalyst near the gas inlet and a 2nd tin-contg. catalyst near the gas outlet, for complete reaction of ethanol with NOx. The 1st catalyst is made of porous inorg. oxides (e.g.,  $\gamma$ - alumina) loaded with silver or silver oxide, and the 2nd catalyst is made of porous inorg. oxides loaded with tin-contg. oxide and  $\geq 1$  transition metal(s) selected from platinum; palladium; ruthenium; gold; and iridium.

IT 64-17-5, Ethanol, processes

RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(method for catalytic purifn. of combustion waste gases using ethanol with complete reaction)

RN 64-17-5 CAPLUS

CN Ethanol (9CI) (CA INDEX NAME)

H<sub>3</sub>C—CH<sub>2</sub>—OH

IC ICM B01D053-94  
ICS B01D053-86; B01J023-14; B01J023-50; B01J023-54  
CC 59-3 (Air Pollution and Industrial Hygiene)  
ST waste combustion gas purifn catalyst **ethanol**; exhaust gas  
nitrogen oxide removal catalyst  
IT Exhaust gases (engine)  
Waste gases  
(method for catalytic purifn. of combustion waste gases using  
**ethanol** with complete reaction)  
IT 1344-28-1,  $\gamma$ -Alumina, uses 7439-88-5, Iridium, uses 7440-05-3,  
Palladium, uses 7440-06-4, Platinum, uses 7440-18-8, Ruthenium,  
uses 7440-22-4, Silver, uses 7440-57-5, Gold, uses 20667-12-3, Silver  
oxide  
RL: CAT (**Catalyst use**); USES (Uses)  
(method for catalytic purifn. of combustion waste gases using  
**ethanol** with complete reaction)  
IT 64-17-5, **Ethanol**, processes  
RL: NUU (Other use, unclassified); PEP (Physical, engineering or  
chemical  
process); PROC (Process); USES (Uses)  
(method for catalytic purifn. of combustion waste gases using  
**ethanol** with complete reaction)  
IT 11104-93-1, Nitrogen oxide, processes  
RL: PEP (Physical, engineering or chemical process); REM (Removal or  
disposal); PROC (Process)  
(method for catalytic purifn. of combustion waste gases using  
**ethanol** with complete reaction)

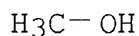
L53 ANSWER 19 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
1997:32485 Document No. 126:119708 The preparation of advanced catalytic  
materials by aerosol processes. Moser, William R.; Lennhoff, John D.;  
Cnossen, Jack E.; Fraska, Karen; Schoonover, Justin W.; Rozak,  
Jeffrey R.  
(Department Chemical Engineering, Worcester Polytechnic Institute,  
Worcester, MA, 01609, USA). Advanced Catalysts and Nanostructured  
Materials, 535-562. Editor(s): Moser, William R. Academic: San  
Diego,  
Calif. (English) 1996. CODEN: 63URAA.  
AB A review, with 50 refs., of aerosol techniques for catalyst prepn.,  
esp.

Henderson

for industrially important catalysts. Topics discussed include: (1) a historical background, (2) advanced catalyst synthesis by high-temp. aerosol decompn. (e.g., reactor configuration), (3) representative catalysts prepd. by this method [e.g., metal-promoted La ferrate perovskites and Fe oxides for **Fischer-Tropsch** reaction; copper-modified zinc chromites for higher alc. synthesis; bismuth molybdates and modified bismuth molybdates for propylene oxidn. to acrolein; copper-zinc aluminate **methanol** synthesis catalysts; cobalt molybdate hydrodesulfurization catalysts; perovskite-type Sr-Ce-Yb oxide catalysts for methane oxidative coupling; alkali-metal modified Zn oxide catalysts; vanadium-phosphorus oxide catalysts for partial oxidn. (e.g., for manuf. of maleic anhydride); noble-metal petroleum dehydrogenation catalysts; alumina-supported silver catalysts for partial oxidn. (e.g., for manuf. of ethylene oxide); Pd on reactive supports for total oxidn. of waste hydrocarbons], and (4) the potential for processing of aerosols in manuf. of com. catalysts.

IT   **67-56-1P, Methanol, preparation**  
 RL: FMU (Formation, unclassified); IMF (Industrial manufacture); FORM (Formation, nonpreparative); PREP (Preparation)  
      (aerosol-based techniques for manuf. of copper-zinc-aluminate-type catalysts for **methanol** synthesis)

RN   67-56-1 CAPLUS  
 CN   Methanol (8CI, 9CI) (CA INDEX NAME)



CC   51-0 (Fossil Fuels, Derivatives, and Related Products)  
 Section cross-reference(s): 35, 60, 67

ST   review aerosol catalyst manuf; **Fischer Tropsch** aerosol catalyst review; **methanol** synthesis aerosol catalyst review; partial oxidn aerosol catalyst review; oxidative coupling aerosol catalyst review; waste gas oxidn aerosol catalyst review

IT   **Alcohols, preparation**  
 RL: FMU (Formation, unclassified); IMF (Industrial manufacture); FORM (Formation, nonpreparative); PREP (Preparation)  
      (C>1; aerosol-based techniques for manuf. of spinel-type **methanol**-synthesis catalysts)

IT   Hydrogenation catalysts

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- (aerosol-based techniques for manuf. of **Fischer-Tropsch** and **methanol** synthesis catalysts)
- IT Chromium spinels  
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(copper-modified zinc chromites; aerosol-based techniques for manuf. of spinel-type **methanol**-synthesis catalysts)
- IT Perovskite-type crystals  
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(lanthanum ferrates [Lax(Ca,Sr)1-xFeO3]; aerosol-based techniques for manuf. of **Fischer-Tropsch** catalysts)
- IT Rare earth oxides  
RL: **CAT (Catalyst use)**; USES (Uses)  
(lanthanum ferrates, perovskites; aerosol-based techniques for manuf. of **Fischer-Tropsch** catalysts)
- IT 7440-05-3, Palladium, uses  
RL: **CAT (Catalyst use)**; USES (Uses)  
(aerosol-based techniques for manuf. of Pd on reactive supports for total oxidn. of hydrocarbons in waste gases)
- IT 13595-85-2P, Bismuth molybdate (Bi<sub>2</sub>Mo<sub>3</sub>O<sub>12</sub>) 146956-92-5P, Bismuth iron molybdenum oxide ((Bi,Fe)<sub>2</sub>Mo<sub>3</sub>O<sub>12</sub>)  
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(aerosol-based techniques for manuf. of bismuth molybdate-type partial oxidn. catalysts for manuf. of propane to acrolein)
- IT 56450-21-6P, Aluminum copper zinc oxide  
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(aerosol-based techniques for manuf. of copper-zinc-aluminate-type catalysts for **methanol** synthesis)
- IT 67-56-1P, **Methanol**, preparation  
RL: FMU (Formation, unclassified); IMF (Industrial manufacture); FORM (Formation, nonpreparative); PREP (Preparation)  
(aerosol-based techniques for manuf. of copper-zinc-aluminate-type catalysts for **methanol** synthesis)
- IT 7439-88-5P, Iridium, uses 7440-06-4P, Platinum, uses  
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(aerosol-based techniques for manuf. of noble metal-based petroleum

- dehydrogenation catalysts)  
IT 186257-34-1P, Lithium zinc oxide (Li0-0.4Zn0.6-100.8-1)  
186257-35-2P,  
Lithium magnesium zinc oxide (Li0-0.4Mg0.3-0.5Zn0.3-0.500.8-1)  
RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP  
(Preparation); USES (Uses)  
(aerosol-based techniques for manuf. of perovskite-type  
alkali-metal  
modified zinc oxide catalysts)  
IT 186299-23-0P, Cobalt copper potassium zirconium oxide  
RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP  
(Preparation); USES (Uses)  
(aerosol-based techniques for manuf. of spinel-type methanol  
-synthesis catalysts)  
IT 12359-27-2P, Vanadyl phosphate ((VOPO<sub>4</sub>))  
RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP  
(Preparation); USES (Uses)  
(aerosol-based techniques for manuf. of vanadium-phosphorus-type  
oxidn.  
catalysts)  
IT 1317-60-8P, Hematite, uses  
RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP  
(Preparation); USES (Uses)  
(aerosol; aerosol-based techniques for manuf. of Fischer-  
Tropsch catalysts)  
IT 7440-22-4P, Silver, uses  
RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP  
(Preparation); USES (Uses)  
(alumina-supported; aerosol-based techniques for manuf. of  
alumina-supported silver partial oxidn. catalysts)  
IT 630-08-0, Carbon monoxide, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(hydrogenation of; aerosol-based techniques for manuf. of  
Fischer-Tropsch and methanol synthesis  
catalysts)  
IT 11104-44-2P, Bismuth molybdate  
RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP  
(Preparation); USES (Uses)  
(partial oxidn. catalysts; aerosol-based techniques for manuf. of  
bismuth molybdate-type partial oxidn. catalysts)  
IT 109547-09-3P, Iron lanthanum strontium oxide (Fe(La,Sr)O<sub>3</sub>)  
110758-99-1P,  
Calcium iron lanthanum oxide ((Ca,La)FeO<sub>3</sub>)  
RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP  
(Preparation); USES (Uses)

(perovskite; aerosol-based techniques for manuf. of **Fischer-Tropsch catalysts**)  
 IT 125149-48-6P, Cerium strontium ytterbium oxide ((Ce,Yb)SrO<sub>2.5-3</sub>)  
 RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP  
 (Preparation); USES (Uses)  
 (perovskite; aerosol-based techniques for manuf. of perovskite-type Sr-Ce-Yb oxide catalysts for methane oxidative coupling)  
 IT 7440-62-2P, Vanadium, uses  
 RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP  
 (Preparation); USES (Uses)  
 (phosphorus-contg. catalysts; aerosol-based techniques for manuf.  
 of vanadium-phosphorus-type oxidn. catalysts)  
 IT 113924-15-5P, Chromium copper zinc oxide (Cr<sub>2</sub>(Cu,Zn)O<sub>4</sub>)  
 186257-33-0P,  
 Cesium chromium copper zinc oxide (Cs<sub>0-1</sub>Cr<sub>1-2</sub>Cu<sub>0.05</sub>Zn<sub>0.504</sub>)  
 RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP  
 (Preparation); USES (Uses)  
 (spinel; aerosol-based techniques for manuf. of spinel-type methanol-synthesis catalysts)  
 IT 1344-28-1P, Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>), uses  
 RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP  
 (Preparation); USES (Uses)  
 (support; aerosol-based techniques for manuf. of alumina-supported silver partial oxidn. catalysts)  
 IT 7723-14-0P, Phosphorus, uses  
 RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP  
 (Preparation); USES (Uses)  
 (vanadium-contg. catalysts; aerosol-based techniques for manuf. of vanadium-phosphorus-type oxidn. catalysts)

L53 ANSWER 20 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
 1995:686849 Document No. 123:56833 Process for the production of alcohols and diols by hydrogenation. Scarlett, John (Eastman Chemical Company, USA). U.S. US 5395990 A 19950307, 14 pp.  
 (English).  
 CODEN: USXXAM. APPLICATION: US 1993-175542 19931230. PRIORITY: GB 1993-24753 19931202.  
 AB A process for the prodn. of a alcs. and diols by hydrogenation of a hydrogenatable material selected from monoesters of carboxylic acids, monoesters of dicarboxylic acids, diesters of dicarboxylic acids, aldehydes, olefinically unsatd. aldehydes, and mixts. of two or more thereof, comprises (a) providing a hydrogenation zone contg. a charge of a

granular hydrogenation catalyst which has a total surface area of at least about 15 m<sup>2</sup> /g, a **pore size** distribution such that more than 50% of the **pore vol.** is provided by **pores** in the **size** range less than about 40 nm, and a surface area distribution such that more than 50% of the total surface area is provided by **pores** in the **size** range of from about 7 nm to about 40 nm; (b) supplying to the hydrogenation zone a feed stream of a mixt. contg. hydrogen and the hydrogenatable material; (c) maintaining the hydrogenation zone under temp. and pressure conditions which are conducive to effecting hydrogenation of the hydrogenatable material; and (d) recovering a product stream comprising the hydroxy compd. The process is exemplified by the hydrogenation of di-Me 1,4-cyclohexanedicarboxylate to yield 1,4-cyclohexanediethanol.

IT 1314-13-2D, Zinc oxide, reduced 7440-05-3, Palladium,  
uses  
RL: **CAT (Catalyst use); USES (Uses)**  
(process for the prodn. of **alcs.** and diols by hydrogenation)  
RN 1314-13-2 CAPLUS  
CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O==Zn

RN 7440-05-3 CAPLUS  
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

IC ICM C07C029-147  
ICS C07C029-14; C07C027-04  
NCL 568864000  
CC 35-2 (Chemistry of Synthetic High Polymers)  
Section cross-reference(s): 45  
ST **alc** diol prepns hydrogenation; cyclohexanediethanol prepns  
hydrogenation; ester hydrogenation; lactone hydrogenation; aldehyde  
hydrogenation  
IT Hydrogenation  
Hydrogenation catalysts  
(process for the prodn. of **alcs.** and diols by hydrogenation)  
IT **Alcohols,** preparation

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- Glycols, preparation  
 RL: IMF (Industrial manufacture); PREP (Preparation)  
 (process for the prodn. of **alcs.** and diols by hydrogenation)
- IT Aldehydes, reactions  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (process for the prodn. of **alcs.** and diols by hydrogenation)
- IT Lactones  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (process for the prodn. of **alcs.** and diols by hydrogenation)
- IT Carboxylic acids, reactions  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (esters, process for the prodn. of **alcs.** and diols by hydrogenation)
- IT 1314-13-2D, Zinc oxide, reduced 1344-70-3D, Copper oxide,  
 reduced 7440-05-3, Palladium, uses 11104-65-7D, Copper  
 chromite, reduced  
 RL: **CAT (Catalyst use); USES (Uses)**  
 (process for the prodn. of **alcs.** and diols by hydrogenation)
- IT 105-08-8P, 1,4-Cyclohexanediethanol  
 RL: IMF (Industrial manufacture); PREP (Preparation)  
 (process for the prodn. of **alcs.** and diols by hydrogenation)
- IT 94-60-0, Dimethyl 1,4-cyclohexanedicarboxylate 96-48-0,  
 $\gamma$ -Butyrolactone 110-62-3, n-Valeraldehyde 123-72-8,  
 n-Butyraldehyde 141-05-9, Diethyl maleate 502-44-3,  
 $\epsilon$ -Caprolactone 624-48-6, Dimethyl maleate 645-62-5,  
 2-Ethyl-hexen-2-al 34880-43-8, 2-Propylhept-2-enal 37942-76-0  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (process for the prodn. of **alcs.** and diols by hydrogenation)

L53 ANSWER 21 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
 1993:237298 Document No. 118:237298 Catalytic **reforming** of toluene  
 with carbon dioxide over rare earth oxide promoted palladium/ $\gamma$ -  
 alumina catalysts. Pillai, S. Muthukumar; Ohnishi, R.; Ichikawa, M.  
 (Res. Cent., Indian Petrochem. Corp. Ltd., Baroda, 391 346, India).  
 Reaction Kinetics and Catalysis Letters, 48(1), 247-54 (English) 1992.  
 CODEN: RKCLAU. ISSN: 0304-4122.

AB On Pd/ $\gamma$ - **Al2O3** catalysts, PhMe undergoes  
**reforming** with CO<sub>2</sub> to give benzene and synthesis gas at 1 atm and  
 400-500°. Among the **promoters**, Ce oxide showed  
 improved selectivity and activity, compared with other rare earth  
 oxides.

Based on the catalytic runs and temp.-programmed reaction expts., the  
 mechanism of the reaction was proposed.

CC 51-11 (Fossil Fuels, Derivatives, and Related Products)  
 Section cross-reference(s): 47

ST toluene oxidn benzene synthesis gas; partial oxidn toluene synthesis gas;  
palladium toluene partial oxidn benzene; rare earth oxide toluene  
oxidn;  
cerium oxide toluene partial oxidn; **reforming** toluene carbon  
dioxide palladium

IT Rare earth oxides  
RL: **CAT (Catalyst use); USES (Uses)**  
(catalysts, contg. palladium, for **reforming** of toluene with  
carbon dioxide, to benzene and synthesis gas)

IT Fuel gas manufacturing  
(synthesis gas, **reforming**, of toluene, with carbon dioxide,  
rare earth oxide-promoted palladium catalysts for)

IT 7440-19-9, Samarium, uses  
RL: **CAT (Catalyst use); USES (Uses)**  
(catalysts, contg. palladium, for partial oxidn.-**reforming** of  
toluene with carbon dioxide, for manuf. of synthesis gas)

IT 7439-89-6, Iron, uses 7439-91-0, Lanthanum, uses 7440-45-1,  
Cerium,  
uses 7440-48-4, Cobalt, uses 7440-62-2, Vanadium, uses  
7440-65-5,  
Yttrium, uses  
RL: **CAT (Catalyst use); USES (Uses)**  
(catalysts, contg. palladium, for **reforming** of toluene with  
carbon dioxide, for manuf. of synthesis gas)

IT 7440-05-3, Palladium, uses  
RL: **CAT (Catalyst use); USES (Uses)**  
(catalysts, rare earth oxide-promoted, for **reforming** of  
toluene with carbon dioxide)

IT 71-43-2P, Benzene, preparation  
RL: FORM (Formation, nonpreparative); PREP (Preparation)  
(formation of, in **reforming** of toluene with carbon dioxide,  
palladium-based catalysts for)

IT 108-88-3, Toluene, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(**reforming** of, with carbon dioxide, for manuf. of synthesis  
gas, palladium catalysts for)

IT 124-38-9, Carbon dioxide, uses  
RL: USES (Uses)  
(toluene **reforming** with, for manuf. of synthesis gas,  
palladium catalysts for)

L53 ANSWER 22 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN  
1980:180613 Document No. 92:180613 Hydrogenation of crotonaldehyde in an  
aqueous solution of lithium hydroxide on mixed 1% **palladium-**

**ruthenium/alumina catalysts.** Tolstykh, E. V.; Kozina, S. M.; Sokol'skii, D. V. (USSR). Khimiya i Khimicheskaya Tekhnologiya (Alma-Ata, 1962-) 166-73 (Russian) 1978. CODEN: SSAKAG. ISSN: 0371-2842.

AB The title reaction initially gave PrCHO in 0.5-1 N LiOH and MeCH<sub>2</sub>:CHCH<sub>2</sub>OH in 0.05-0.1 N LiOH. The final BuOH yield passed through a max. of 77.5% yield in 0.1 N LiOH over 1% 1:3 Pd-Ru/Al<sub>2</sub>O<sub>3</sub>.

IT 71-36-3P, preparation

RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. of, by hydrogenation of crotonaldehyde, mechanism of catalytic)

RN 71-36-3 CAPLUS

CN 1-Butanol (9CI) (CA INDEX NAME)



CC 23-7 (Aliphatic Compounds)

IT 7440-18-8, uses and miscellaneous

RL: CAT (Catalyst use); USES (Uses)  
(catalyst, with palladium, for hydrogenation of crotonaldehyde, effect  
of lithium hydroxide concn. of, on mechanism with)

IT 7440-05-3, uses and miscellaneous

RL: CAT (Catalyst use); USES (Uses)  
(catalyst, with ruthenium, for hydrogenation of crotonaldehyde, effect  
of lithium hydroxide concn. on mechanism with)

IT 71-36-3P, preparation

RL: SPN (Synthetic preparation); PREP (Preparation)  
(prepn. of, by hydrogenation of crotonaldehyde, mechanism of catalytic)

=> d 154 1-88 ti

L54 ANSWER 1 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

TI Low-temperature combustion of CH<sub>4</sub> over CeO<sub>2</sub>-MO<sub>x</sub> solid solution (M = Zr<sup>4+</sup>, La<sup>3+</sup>, Ca<sup>2+</sup>, or Mg<sup>2+</sup>) promoted Pd/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> catalysts

L54 ANSWER 2 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

TI Behavior of Fresh and Deactivated Combustion Promoter Additives

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- L54 ANSWER 3 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Method for preparation of ruthenium-alumina catalyst used in ammonia synthesis
- L54 ANSWER 4 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Effects of promoters on the catalytic properties and surface characteristics of Ru-B/ZrO<sub>2</sub> amorphous alloy catalysts
- L54 ANSWER 5 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Effects of cerium oxide on the oxidation activity and thermal stability of Pd/Al<sub>2</sub>O<sub>3</sub> catalysts
- L54 ANSWER 6 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Influence of the nature of the Ce-promoter on the behavior of Pd and Pd-Cr TWC systems
- L54 ANSWER 7 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Catalytic ceramic membrane in a three-phase reactor for the competitive hydrogenation-isomerization of methylenecyclohexane
- L54 ANSWER 8 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Effects of Ni on the activity of Pd-La-Ce automotive exhaust catalysts
- L54 ANSWER 9 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI The thermal stability and catalytic performance of Ce-Zr promoted Rh-Pd/γ-Al<sub>2</sub>O<sub>3</sub> automotive catalysts
- L54 ANSWER 10 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Catalytic performance of Pd/Al<sub>2</sub>O<sub>3</sub> catalyst prepared by glow discharge plasma method for selective hydrogenation of acetylene
- L54 ANSWER 11 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Metal-promoter interface in Pd/(Ce, Zr)O<sub>x</sub>/Al<sub>2</sub>O<sub>3</sub> catalysts: effect of thermal aging
- L54 ANSWER 12 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Method and apparatus for exhaust gas treatment
- L54 ANSWER 13 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Activity and stability of RuO<sub>2</sub>/γ-Al<sub>2</sub>O<sub>3</sub> catalyst in wet air oxidation

Henderson

- L54 ANSWER 14 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Catalysts for cleaning of diesel engine exhaust gases
- L54 ANSWER 15 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Oxidative decomposition of naphthalene by supported metal catalysts
- L54 ANSWER 16 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Promoted nickel-magnesium oxide catalysts and process for producing synthesis gas
- L54 ANSWER 17 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Promoted nickel-magnesium oxide catalysts for producing synthesis gas  
by autothermal partial oxidation
- L54 ANSWER 18 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Discovery of new paraffin isomerization catalysts based on SO<sub>4</sub><sup>2-</sup>/ZrO<sub>2</sub>  
and WO<sub>x</sub>/ZrO<sub>2</sub> applying combinatorial techniques
- L54 ANSWER 19 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Ceria and automotive catalyst
- L54 ANSWER 20 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Combustion-deposited metal-metal oxide catalysts for short-contact-time  
partial oxidation of methane to synthesis gas
- L54 ANSWER 21 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Activity of Pd/Al<sub>2</sub>O<sub>3</sub> and Ru/Al<sub>2</sub>O<sub>3</sub> catalysts in the hydrogenation of o-xylene. Effect of thiophene
- L54 ANSWER 22 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Preparation of Pd-Ce/ZrO<sub>2</sub> catalysts for methane oxidation
- L54 ANSWER 23 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Ceramic fiber filter having catalysts and promoters supported on coat layer
- L54 ANSWER 24 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Ceramic body and ceramic catalyst body
- L54 ANSWER 25 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Influence of thermal sintering on the activity for CO-02 and CO-02-NO

Henderson

stoichiometric reactions over Pd/ (Ce, Zr) Ox/Al<sub>2</sub>O<sub>3</sub> catalysts

- L54 ANSWER 26 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Photocatalytic interior wall sheets with good humidity controlling properties
- L54 ANSWER 27 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Total oxidation of methane over palladium catalyst supported on modified alumina
- L54 ANSWER 28 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Supported Pd catalysts for high-temperature methane combustion - examining the combustion synthesis preparation method
- L54 ANSWER 29 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Catalyst-supported filter for purification of exhaust gas
- L54 ANSWER 30 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Effects of Copper on the Catalytic Properties of Bimetallic Pd-Cu/ (Ce, Zr) Ox/Al<sub>2</sub>O<sub>3</sub> and Pd-Cu/ (Ce, Zr) Ox Catalysts for CO and NO Elimination
- L54 ANSWER 31 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Interior walls with photocatalytic materials also showing humidity-controlling properties and their manufacture
- L54 ANSWER 32 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Pd-, Pt-, and Rh-Loaded Ce<sub>0.6</sub>Zr<sub>0.35</sub>Y<sub>0.05</sub>O<sub>2</sub> Three-Way Catalysts: An Investigation on Performance and Redox Properties
- L54 ANSWER 33 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Preparation of Ru Nanoparticles Supported on  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> and Its Novel Catalytic Activity for Ammonia Synthesis
- L54 ANSWER 34 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Effect of Thermal Sintering on Light-Off Performance of Pd/ (Ce, Zr) Ox/Al<sub>2</sub>O<sub>3</sub> Three-Way Catalysts: Model Gas and Engine Tests
- L54 ANSWER 35 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Study of CeO<sub>2</sub>-ZrO<sub>2</sub> solid solution promoters modified by Nd
- L54 ANSWER 36 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

- TI Preparation method study on Pd/Ce/Al/monolith honeycomb catalyst
- L54 ANSWER 37 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Membrane-catalyst systems for selectivity improvement in dehydrogenation and hydrogenation reactions
- L54 ANSWER 38 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Conversion of ethane to ethylene and synthesis gas with cerium oxide. Promoting effect of Pt, Rh and Ru
- L54 ANSWER 39 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI New Pd/CexZr1-xO2/Al2O3 three-way catalysts prepared by microemulsion. Part 2. In situ analysis of CO oxidation and NO reduction under stoichiometric CO + NO + O<sub>2</sub>
- L54 ANSWER 40 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI New Pd/CexZr1-xO2/Al2O3 three-way catalysts prepared by microemulsion. Part 1. Characterization and catalytic behavior for CO oxidation
- L54 ANSWER 41 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Effect of rare earth promoter on complete oxidation activity of Pd/Al<sub>2</sub>O<sub>3</sub> catalyst for methane
- L54 ANSWER 42 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI A new approach of CeO<sub>2</sub> and La<sub>2</sub>O<sub>3</sub> effects on the three-way catalysts containing low precious metals
- L54 ANSWER 43 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Structure of Pd/CeO<sub>x</sub>/Al<sub>2</sub>O<sub>3</sub> Catalysts for NO<sub>x</sub> Reduction Determined By Situ X-ray Absorption Spectroscopy
- L54 ANSWER 44 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Correlation between basicity and the adsorption of NO on supported Pd catalysts
- L54 ANSWER 45 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Characterization of model automotive exhaust catalysts: Pd on Zr-rich ceria-zirconia supports
- L54 ANSWER 46 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Neural network modeling of transition metal-zeolite exhaust catalysts

- L54 ANSWER 47 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Thermal aging of Pd/Pt/Rh automotive catalysts under a cycled oxidizing-reducing environment
- L54 ANSWER 48 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Modifying catalytic properties of palladium by addition if rare earths (Ce, La): activity and catalytic selectivity in hydrocarbon conversion reactions
- L54 ANSWER 49 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Effect of CuO on performance of precious metal/CeO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> monolith catalyst
- L54 ANSWER 50 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Sealed solid electrolyte permselective gas sensors
- L54 ANSWER 51 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Influence of Ceria on Pd Activity for the CO+O<sub>2</sub> Reaction
- L54 ANSWER 52 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI New method of liquid phase hydrogenation by metallic catalysts
- L54 ANSWER 53 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Characteristics of Pd catalysts for methane oxidation
- L54 ANSWER 54 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Catalyst for treating exhaust gases from internal combustion engines
- L54 ANSWER 55 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Modification by lanthanide (La, Ce) promotion of catalytic properties of palladium: Characterization of the catalysts
- L54 ANSWER 56 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Catalytic decomposition of CFCs
- L54 ANSWER 57 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI CO oxidation on Pd/CeO<sub>2</sub>-ZrO<sub>2</sub> catalysts
- L54 ANSWER 58 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI The role of zirconium in novel three-way catalysts
- L54 ANSWER 59 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Kinetics of wet oxidation of black liquor over a Pt-Pd-Ce/alumina catalyst

- L54 ANSWER 60 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Alumina-Supported Noble Metal Catalysts for Destructive Oxidation of Organic Pollutants in Effluent from a Softwood Kraft Pulp Mill
- L54 ANSWER 61 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Light-off performance over cobalt oxide- and ceria-promoted platinum and palladium catalysts
- L54 ANSWER 62 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Low temperature catalytic activity of cobalt oxide and ceria promoted Pt and Pd: -influence of pretreatment and gas composition
- L54 ANSWER 63 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Terbium and cerium promotion of NO decomposition and NO-CO reaction on Pd and Rh catalysts
- L54 ANSWER 64 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Exhaust gas purification catalysts consisting of stainless steel honeycomb carriers with improved mechanical strength and manufacture of the catalysts
- L54 ANSWER 65 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI The effect of promoters on Pt/Al<sub>2</sub>O<sub>3</sub> catalysts for the reduction of NO by C<sub>3</sub>H<sub>6</sub> under lean-burn conditions
- L54 ANSWER 66 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Predoped iron oxide dehydrogenation catalysts for styrene manufacture
- L54 ANSWER 67 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Exhaust gas treatment catalyst complex containing mixed cerium and zirconium oxide promoter
- L54 ANSWER 68 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Reduction of mixed alumina-supported Pt-Ru-Ce catalysts with hydrogen
- L54 ANSWER 69 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Regeneration of dehydrogenation and dehydrocyclization catalysts by decoking with chlorine and molecular oxygen
- L54 ANSWER 70 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

- TI Palladium alloy catalyst for thermal decomposition of NO
- L54 ANSWER 71 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Catalysts for combustion of hydrocarbon oils
- L54 ANSWER 72 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Magnesium oxide-lanthanum oxide-alumina non-spinel ternary metal oxides  
for metals passivation and sulfur oxide control in petroleum catalytic cracking
- L54 ANSWER 73 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Effect of cerium on performance and physicochemical properties of platinum-containing automotive emission control catalysts
- L54 ANSWER 74 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Preparation and characterization of chlorine-free ruthenium catalysts and  
the promoter effect in ammonia synthesis. 3. A magnesia-supported ruthenium catalyst
- L54 ANSWER 75 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Preparation and characterization of chlorine-free ruthenium catalysts and  
the promoter effect in ammonia synthesis. 2. A lanthanide oxide-promoted  
ruthenium/alumina catalyst
- L54 ANSWER 76 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Methane oxidation over alumina-supported noble metal catalysts with and  
without cerium additives
- L54 ANSWER 77 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Lanthanide nitrates as effective promoters of a ruthenium-alumina catalyst  
for ammonia synthesis
- L54 ANSWER 78 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI New concept of promoter action in supported ruthenium catalyst for ammonia synthesis
- L54 ANSWER 79 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Characterization of palladium/ $\gamma$ -alumina catalysts containing ceria

Henderson

- L54 ANSWER 80 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Structural analysis of zinc oxide/zinc chromium oxide  
(ZnCr<sub>2</sub>O<sub>4</sub>)/palladium  
catalyst
- L54 ANSWER 81 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Oxidation state of cerium in cerium-based catalysts investigated by  
spectroscopic probes
- L54 ANSWER 82 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Effects of platinum, palladium, and ruthenium on the reducibility of  
cerium (4+) ions in cerium-alumina catalysts and the reactivity of  
oxygen  
radicals
- L54 ANSWER 83 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI High-temperature catalyst compositions for internal combustion engines
- L54 ANSWER 84 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Oxidation catalyst for turbine exhaust gas purging at high  
temperature and  
space velocity
- L54 ANSWER 85 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Interaction of cerium oxide with noble metals
- L54 ANSWER 86 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Mixed **palladium-ruthenium** and palladium-rhodium  
catalyst on an **alumina** support for the hydrogenation of phenol
- L54 ANSWER 87 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Catalytic compositions
- L54 ANSWER 88 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
TI Catalyst composition of copper oxide-iron oxide on alumina

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L54 ANSWER 4 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
2004:273407 Document No. 140:259715 Effects of promoters on the  
catalytic  
properties and surface characteristics of Ru-B/ZrO<sub>2</sub> amorphous alloy

Henderson

catalysts. Han, Min-le; Liu, Shou-chang; Yang, Xiao-di; Wang, Ke; Qiao,

Yu-qin; Zhang, Shu-fang (Department of Chemistry, Zhengzhou University,

Zhengzhou, 450052, Peop. Rep. China). Fenzi Cuihua, 18(1), 47-50 (Chinese) 2004. CODEN: FECUEN. ISSN: 1001-3555. Publisher: Kexue Chubanshe.

AB On the basis of the measurement of activity and selectivity, the effects

of Fe, Zn, La and Ce **promoters** on the catalytic properties and surface character of Ru-B/ZrO<sub>2</sub>

amorphous alloy catalysts have been studied by means of BET surface measurement, DSC and TPR etc. The results show that the **promoters** can increase the activity and selectivity evidently, enhance thermal stability of the amorphous alloy catalysts, influence on surface properties and redn. behavior of the catalysts. It was found that there

are metal state and Ru-B-O species for Ru as an active component under the catalytic reaction conditions, which are relative to

the activity and selectivity resp.

IT 7440-45-1, Cerium, uses

RL: CAT (Catalyst use); PRP (Properties); USES (Uses)  
(effects of **promoters** on catalytic properties and surface characteristics of Ru-B/ZrO<sub>2</sub> amorphous alloy catalysts)

RN 7440-45-1 CAPLUS

CN Cerium (8CI, 9CI) (CA INDEX NAME)

Ce

CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)  
Section cross-reference(s): 56, 66

IT Metallic glasses

Metals, uses

RL: CAT (Catalyst use); PRP (Properties); USES (Uses)  
(effects of **promoters** on catalytic properties and surface characteristics of Ru-B/ZrO<sub>2</sub> amorphous alloy catalysts)

IT 1314-23-4, Zirconia, uses 7439-89-6, Iron, uses 7439-91-0,  
Lanthanum,

uses 7440-45-1, Cerium, uses 7440-66-6, Zinc, uses  
454251-87-7

RL: CAT (Catalyst use); PRP (Properties); USES (Uses)

Henderson

(effects of **promoters** on catalytic properties and surface characteristics of Ru-B/**ZrO<sub>2</sub>** amorphous alloy catalysts)

L54 ANSWER 5 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
2004:195055 Document No. 140:274976 Effects of cerium oxide on the oxidation

activity and thermal stability of Pd/Al<sub>2</sub>O<sub>3</sub> catalysts. He, Chong-Heng; Zhu, Ming; Jin, Guo-Lin; Xu, Pei-Ruo; Wang, Ren (Coll. Chem. Eng., East

China Univ. Sci. & Technol., Shanghai, 200237, Peop. Rep. China). Yingyong Huaxue, 21(2), 154-158 (Chinese) 2004. CODEN: YIHUED. ISSN: 1000-0518. Publisher: Kexue Chubanshe.

AB The effects of **cerium** oxide on the catalytic activity and thermal stability of **Pd/Al<sub>2</sub>O<sub>3</sub>** were investigated.

**Cerium** oxide improved the performance of **Pd/Al<sub>2</sub>O<sub>3</sub>** catalysts in removal of CO and C<sub>3</sub>H<sub>6</sub> from simulated exhaust gas. **Cerium** oxide could widen the operation-window of oxidn. reaction under redn. conditions ( $\lambda > 1$ ) due to its high oxygen storage-release capacity. Moreover, a great advantage of **cerium** oxide as a **promoter** is that it stabilizes the dispersion of **Pd** particles on the surface of **Al<sub>2</sub>O<sub>3</sub>** during the sintering process. It may be due to the interaction of **Pd** with **cerium** oxide to form a **Pd**.delta.+ species which are more stable than **Pd** at high temp.

CC 59-3 (Air Pollution and Industrial Hygiene)

Section cross-reference(s): 51, 67

IT 1306-38-3, Cerium oxide, uses 1344-28-1, Alumina, uses 7440-05-3, Palladium, uses

RL: **CAT (Catalyst use); USES (Uses)**

of (effects of cerium oxide on oxidn. activity and thermal stability  
Pd/Al<sub>2</sub>O<sub>3</sub> catalysts)

L54 ANSWER 6 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
2004:149523 Document No. 140:394580 Influence of the nature of the Ce-promoter on the behavior of Pd and Pd-Cr TWC systems.

Iglesias-Juez,

A.; Martinez-Arias, A.; Hungria, A. B.; Anderson, J. A.; Conesa, J. C.;

Soria, J.; Fernandez-Garcia, M. (CSIC, Instituto de Catalisis y Petroleoquimica, Madrid, 28049, Spain). Applied Catalysis, A: General,

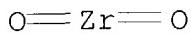
259(2), 207-220 (English) 2004. CODEN: ACAGE4. ISSN: 0926-860X.  
Publisher: Elsevier Science B.V..

- AB A series of monometallic **Pd** and bimetallic **Pd-Cr** catalysts supported on **CeO<sub>x</sub>/Al<sub>2</sub>O<sub>3</sub>** (CA) and **(Ce, Zr)<sub>x</sub>O<sub>x</sub>/Al<sub>2</sub>O<sub>3</sub>** (CZA) materials have been characterized using a combination of x-ray diffraction (XRD), electron microscopy, and Raman spectroscopy, and ESR and in situ diffuse reflectance Fourier transform IR and x-ray near-edge structure spectroscopies were used to analyze the redox and chem. processes taking place under light-off conditions in a gaseous, stoichiometric mixt. contg. CO, NO, and O<sub>2</sub>. The catalytic behavior of these mono- and bimetallic systems was strongly affected by the nature of the **cerium-contg. promoter**. The **Pd**-ceria interface appeared significantly more active than **Pd**-ceria/**zirconia** in both CO oxidn. and NO redn. processes under stoichiometric conditions. This factor seems to dominate the differential behavior of **Pd** monometallic systems. In the case of **Pd-Cr** bimetallic systems, an addnl. strong influence of the base metal on the oxidn. state of **Pd** appears of importance in explaining the catalytic behavior of the samples. For the **CeO<sub>x</sub>/Al<sub>2</sub>O<sub>3</sub>**-supported catalyst, the formation of **Pd(0)** at lower temps. leads to an initial enhancement in activity, while formation of a **Pd-Cr** alloy above 473 K suppressed full NO conversion at high temps. These effects were absent in the **(Ce, Zr)<sub>x</sub>O<sub>x</sub>/Al<sub>2</sub>O<sub>3</sub>**-supported system.
- IT 1344-28-1, Aluminum oxide (**Al<sub>2</sub>O<sub>3</sub>**), uses  
 RL: **CAT (Catalyst use); USES (Uses)**  
 (catalyst support; influence of the nature of the **Ce** **promoter** on the behavior of **Pd** and **Pd-Cr** three-way exhaust gas catalyst systems)
- RN 1344-28-1 CAPLUS  
 CN Aluminum oxide (**Al<sub>2</sub>O<sub>3</sub>**) (8CI, 9CI) (CA INDEX NAME)
- \*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*
- CC 59-3 (Air Pollution and Industrial Hygiene)  
 Section cross-reference(s): 51, 67
- IT 1344-28-1, Aluminum oxide (**Al<sub>2</sub>O<sub>3</sub>**), uses  
 RL: **CAT (Catalyst use); USES (Uses)**  
 (catalyst support; influence of the nature of the **Ce** **promoter** on the behavior of **Pd** and **Pd-Cr** three-way exhaust gas catalyst systems)
- IT 7440-05-3, Palladium, uses 7440-47-3, Chromium, uses 53169-24-7, Cerium zirconium oxide (Ce<sub>0.5</sub>Zr<sub>0.5</sub>O<sub>2</sub>)  
 RL: **CAT (Catalyst use); USES (Uses)**

and  
(influence of the nature of the Ce promoter on the behavior of Pd  
Pd-Cr three-way exhaust gas catalyst systems)

- L54 ANSWER 11 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
2003:926567 Document No. 140:222067 Metal-promoter interface in  
Pd/(Ce,Zr)O<sub>x</sub>/Al<sub>2</sub>O<sub>3</sub> catalysts: effect of  
thermal aging. Iglesias-Juez, A.; Martinez-Arias, A.;  
Fernandez-Garcia,  
M. (CSIC, Instituto de Catalisis y Petroleoquimica, Madrid, 28049,  
Spain).  
Journal of Catalysis, 221(1), 148-161 (English) 2004. CODEN: JCTLA5.  
ISSN: 0021-9517. Publisher: Elsevier Science.
- AB The behavior of Pd three-way catalysts (TWCs) promoted  
with Ce-Zr mixed oxides and supported on alumina,  
which were subjected to thermal degrdn. treatments, has been exmd.  
during  
light-off tests under stoichiometric CO + NO + O<sub>2</sub>. Attention was  
paid to  
the region of aging temp. 1273-1373 K, where phase segregation of the  
ceria-zirconia promoter occurs. Characterization of  
the samples was performed using x-ray diffraction and Raman  
spectroscopy.  
In situ XANES/DRIFTS studies of the Pd chem. state at the  
surface and in the bulk of the materials were conducted to det. the  
noble  
metal response to the gas atm. during light-off. ESR was used to  
analyze  
the promoter surface and to study the redox response of the  
materials in contact with the reactant gases. Thermal degrdn.  
appears to  
sinter both the noble metal and promoter components of the  
catalyst but also stabilizes oxidized Pd entities in contact  
with the promoter prior to the occurrence of the Ce-Zr  
phase segregation reaction. Addnl., it enriches the promoter  
surface in the lanthanide cation. The influence of these physicochem.  
phenomena on the catalytic properties of the Pd-based TWCs is  
discussed.
- IT 1314-23-4, Zirconium oxide (ZrO<sub>2</sub>), formation  
(nonpreparative)  
RL: CAT (Catalyst use); FMU (Formation, unclassified); FORM  
(Formation, nonpreparative); USES (Uses)  
(mixed-oxide promoter formation from; thermal aging effect on  
metal-promoter interface in Pd/(Ce,Zr)O<sub>x</sub>/  
Al<sub>2</sub>O<sub>3</sub> three-way exhaust gas catalysts)

RN 1314-23-4 CAPLUS  
CN Zirconium oxide (ZrO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



IT 1344-28-1, Alumina, uses 7440-05-3,  
Palladium, uses  
RL: CAT (Catalyst use); USES (Uses)  
(thermal aging effect on metal-promoter interface in  
Pd/(Ce, Zr)O<sub>x</sub>/Al<sub>2</sub>O<sub>3</sub> three-way exhaust gas  
catalysts)

RN 1344-28-1 CAPLUS  
CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 7440-05-3 CAPLUS  
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

CC 59-3 (Air Pollution and Industrial Hygiene)  
Section cross-reference(s): 51, 67  
ST metal promoter interface palladium cerium  
zirconium oxide alumina catalyst; three way exhaust catalyst  
palladium cerium zirconium oxide alumina  
IT IR spectra  
(Fourier-transform, diffuse reflectance, of catalysts; thermal  
aging  
effect on metal-promoter interface in Pd/(  
Ce, Zr)O<sub>x</sub>/Al<sub>2</sub>O<sub>3</sub> three-way exhaust gas catalysts)  
IT Oxidation catalysts  
Reduction catalysts  
(exhaust gas; thermal aging effect on metal-promoter  
interface in Pd/(Ce, Zr)O<sub>x</sub>/Al<sub>2</sub>O<sub>3</sub> three-way  
exhaust gas catalysts)  
IT ESR (electron spin resonance)  
Raman spectra  
Thermal aging  
X-ray diffraction  
XANES spectra  
(of catalysts; thermal aging effect on metal-promoter

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IT      interface in **Pd/(Ce,Zr)O<sub>x</sub>/Al<sub>2</sub>O<sub>3</sub>** three-way  
exhaust gas catalysts)

IT      Catalysts  
(three-way exhaust gas; thermal aging effect on metal-**promoter**  
interface in **Pd/(Ce,Zr)O<sub>x</sub>/Al<sub>2</sub>O<sub>3</sub>** three-way  
exhaust gas catalysts)

IT      Catalysts  
(three-way, exhaust gas; thermal aging effect on metal-**promoter**  
interface in **Pd/(Ce,Zr)O<sub>x</sub>/Al<sub>2</sub>O<sub>3</sub>** three-way  
exhaust gas catalysts)

IT      Exhaust gas catalytic converters  
(three-way; thermal aging effect on metal-**promoter** interface  
in **Pd/(Ce,Zr)O<sub>x</sub>/Al<sub>2</sub>O<sub>3</sub>** three-way exhaust  
gas catalysts)

IT      1306-38-3, Cerium oxide (CeO<sub>2</sub>), formation (nonpreparative)  
1314-23-4, Zirconium oxide (ZrO<sub>2</sub>), formation  
(nonpreparative)  
RL: **CAT (Catalyst use)**; FMU (Formation, unclassified); FORM  
(Formation, nonpreparative); USES (Uses)  
(mixed-oxide **promoter** formation from; thermal aging effect on  
metal-**promoter** interface in **Pd/(Ce,Zr)O<sub>x</sub>/Al<sub>2</sub>O<sub>3</sub>** three-way exhaust gas catalysts)

IT      65453-23-8, Cerium zirconium oxide  
RL: **CAT (Catalyst use)**; USES (Uses)  
(**promoter**; thermal aging effect on metal-**promoter**  
interface in **Pd/(Ce,Zr)O<sub>x</sub>/Al<sub>2</sub>O<sub>3</sub>** three-way  
exhaust gas catalysts)

IT      630-08-0, Carbon monoxide, reactions    11104-93-1, Nitrogen oxide  
(NO<sub>x</sub>),  
reactions  
RL: RCT (Reactant); REM (Removal or disposal); PROC (Process); RACT  
(Reactant or reagent)  
(removal of; thermal aging effect on metal-**promoter** interface  
in **Pd/(Ce,Zr)O<sub>x</sub>/Al<sub>2</sub>O<sub>3</sub>** three-way exhaust  
gas catalysts)

IT      1344-28-1, Alumina, uses 7440-05-3,  
Palladium, uses  
RL: **CAT (Catalyst use)**; USES (Uses)  
(thermal aging effect on metal-**promoter** interface in  
**Pd/(Ce,Zr)O<sub>x</sub>/Al<sub>2</sub>O<sub>3</sub>** three-way exhaust gas  
catalysts)

L54 ANSWER 16 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
2003:696827 Document No. 139:216770 Promoted nickel-magnesium oxide  
catalysts and process for producing synthesis gas. Ramani, Sriram;

Allison, Joe D.; Minahan, David M.; Wright, Harold A. (Conoco Inc., USA).

PCT Int. Appl. WO 2003072492 A1 20030904, 37 pp. DESIGNATED STATES:

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO,  
CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU,  
ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA,  
MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG,  
SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, AM,  
AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM,  
CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT,  
SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO  
2003-US627

20030109. PRIORITY: US 2002-PV359258 20020222.

AB Synthesis gas (CO/H) is produced by passing a mixt. of light hydrocarbons

contg. 50 vol.% of methane and oxygen over a catalyst while maintaining

autothermal catalytic partial oxidn. **promoting** conditions. The catalyst consists of a nickel-magnesium oxide solid soln. and at least one

**promoter**, such as Cr, Mn, Mo, W, Sn, Re, Rh, Ru, Ir, Pt, La, Ce, Sm, Yb, Lu, Bi, Sb, In, P, or their oxides carried on a refractory support. The support can be **zirconia**, magnesia stabilized **zirconia**, **zirconia** stabilized **alumina**, yttrium stabilized **zirconia**, calcium stabilized **zirconia**, **alumina**, cordierite, mullite, titania, silica, magnesia, niobia, vanadia, nitrides, or carbides. The catalyst is prep'd.

by impregnating a support with a MgO precursor which is decompd. by thermal treatment to obtain a MgO impregnated support, followed by impregnation of the product with a nickel or nickel oxide precursor which

is thermally treated to obtain a Ni and/or nickel oxide, MgO contg. intermediate, followed by impregnation with a **promotor** precursor, thermal treatment, and optional redn. of the catalyst. The partial oxidn. process is carried out at 200-10,000 kPa and 600-1,600 whereby the gas is passed over the catalyst at a gas hourly space velocity

Henderson

of 100,000,000/h with a catalyst residence time of 10 ms. A combustible

gas is added to the reaction mixt. sufficient to initiate a net catalytic

partial oxidn. reaction. The reaction mixt. is preheated to 30-750.

IT 1314-23-4, Zirconia, uses 1314-23-4D, Zirconia,  
magnesia, Y, Ca-stabilized 1344-28-1, Alumina, uses  
1344-28-1D, Alumina, zirconia-stabilized

RL: CAT (Catalyst use); USES (Uses)

(catalyst support; promoted nickel-magnesium oxide catalysts for  
producing synthesis gas by autothermal partial oxidn.)

RN 1314-23-4 CAPLUS

CN Zirconium oxide (ZrO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)

O—Zr—O

RN 1314-23-4 CAPLUS

CN Zirconium oxide (ZrO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)

O—Zr—O

RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT 7440-18-8, Ruthenium, uses 7440-45-1, Cerium,

uses

RL: CAT (Catalyst use); USES (Uses)

(promoter; promoted nickel-magnesium oxide

catalysts for producing synthesis gas by autothermal partial

oxidn.)

RN 7440-18-8 CAPLUS

CN Ruthenium (8CI, 9CI) (CA INDEX NAME)

Ru

Henderson

RN 7440-45-1 CAPLUS  
CN Cerium (8CI, 9CI) (CA INDEX NAME)

Ce

IC ICM C01B003-26  
ICS B01J023-755  
CC 51-11 (Fossil Fuels, Derivatives, and Related Products)  
Section cross-reference(s): 67  
IT Carbides  
Nitrides  
RL: CAT (Catalyst use); USES (Uses)  
(catalyst support; promoted nickel-magnesium oxide catalysts for  
producing synthesis gas by autothermal partial oxidn.)  
IT 1302-88-1, Cordierite 1302-93-8, Mullite 1313-96-8, Niobia  
1314-23-4, Zirconia, uses 1314-23-4D, Zirconia,  
magnesia, Y, Ca-stabilized 1314-62-1, Vanadia, uses 1344-28-1,  
Alumina, uses 1344-28-1D, Alumina, zirconia-stabilized  
7631-86-9, Silica, uses 13463-67-7, Titania, uses  
RL: CAT (Catalyst use); USES (Uses)  
(catalyst support; promoted nickel-magnesium oxide catalysts for  
producing synthesis gas by autothermal partial oxidn.)  
IT 7440-65-5D, Yttrium, zirconia stabilized with 7440-70-2D, Calcium,  
zirconia stabilized with  
RL: CAT (Catalyst use); MOA (Modifier or additive use); USES  
(Uses)  
(catalyst support; promoted nickel-magnesium oxide catalysts for  
producing synthesis gas by autothermal partial oxidn.)  
IT 1309-48-4, Magnesium oxide (MgO), uses 1313-99-1, Nickel oxide, uses  
7440-02-0, Nickel, uses  
RL: CAT (Catalyst use); USES (Uses)  
(promoted nickel-magnesium oxide catalysts for producing synthesis  
gas  
by autothermal partial oxidn.)  
IT 74-82-8, Methane, reactions 142-72-3, Magnesium acetate 373-02-4,  
Nickel acetate 7782-44-7, Oxygen, reactions 10099-59-9, Lanthanum  
nitrate 10103-47-6, Chromium nitrate 10377-60-3, Magnesium nitrate  
10377-66-9, Manganese nitrate 13138-45-9, Nickel nitrate  
17309-53-4,  
Cerium nitrate 20634-12-2, Platinum(2+), tetraammine-, dinitrate  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(promoted nickel-magnesium oxide catalysts for producing

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synthesis gas by autothermal partial oxidn.)  
IT 7439-88-5, Iridium, uses 7439-91-0, Lanthanum, uses 7439-94-3,  
Lutetium, uses 7439-96-5, Manganese, uses 7439-98-7, Molybdenum,  
uses  
7440-06-4, Platinum, uses 7440-15-5, Rhenium, uses 7440-16-6,  
Rhodium,  
uses 7440-18-8, Ruthenium, uses 7440-19-9, Samarium, uses  
7440-31-5, Tin, uses 7440-33-7, Tungsten, uses 7440-36-0,  
Antimony,  
uses 7440-45-1, Cerium, uses 7440-47-3, Chromium,  
uses 7440-64-4, Ytterbium, uses 7440-69-9, Bismuth, uses  
7440-74-6,  
Indium, uses 7723-14-0, Phosphorus, uses  
RL: CAT (Catalyst use); USES (Uses)  
(promoter; promoted nickel-magnesium oxide  
catalysts for producing synthesis gas by autothermal partial  
oxidn.)

L54 ANSWER 58 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
1998:539531 Document No. 129:206394 The role of zirconium in novel  
three-way

catalysts. Mussmann, L.; Lindner, D.; Lox, E. S.; Van Yperen, R.;  
Kreuzer, T. P.; Mitsushima, I.; Taniguchi, S.; Garr, G. (Degussa AG,  
Germany). Society of Automotive Engineers, [Special Publication] SP,  
SP-1288(Zirconium in Emission Control), 57-68 (English) 1997. CODEN:  
SAESA2. ISSN: 0099-5908. Publisher: Society of Automotive Engineers.

AB Zirconium dioxide (**zirconia**) is a well-known material often  
being a major component in the washcoat systems of three-way catalysts  
(TWC) and diesel oxidn. catalysts. One important characteristic of  
**zirconia** contg. washcoats is an improved aging stability which is  
required to meet the more and more stringent emission stds. In the

last  
few years the utilization of **zirconia** became even more important  
- esp. for high sophisticated three-way washcoat systems. This was  
due to

the development of high temp. stable oxygen storage components, contg.  
**cerium** dioxide (ceria) in combination with different other oxides  
- one very promising candidate being **zirconia**. In the present  
work the results of a research program are discussed, focusing on the  
influence of **zirconia** in combination with ceria and addnl. rare  
earth **promoters** on the stability of the oxygen storage  
characteristics. The performance of these materials was tested in  
powder

expts. as well as in completely formulated Pd-contg. TWC.  
Special emphasis is put on a new developed dynamic oxygen storage  
model

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gas test, on activity tests in a model gas and on real engine evaluation

for the most promising systems. In summary the best catalyst performance

could be achieved with **zirconia** rich and ceria poor oxygen storage components in combination with small amts. of extra stabilizers.

These new developed **zirconia** rich materials enhance significantly the stability of the oxygen storage component per mass unit

ceria. By this, the amt. of expensive ceria in the washcoat could be decreased dramatically upon maintaining improved activity of **Pd**-based catalysts, even after high temp. engine aging.

CC 59-3 (Air Pollution and Industrial Hygiene)

Section cross-reference(s): 67

IT 1306-38-3, Ceria, uses 1314-23-4, Zirconia, uses 7440-05-3, Palladium, uses

RL: **CAT (Catalyst use); USES (Uses)**  
(role of zirconium in novel three-way catalysts)

L54 ANSWER 79 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

1988:616809 Document No. 109:216809 Characterization of palladium/ $\gamma$ -alumina catalysts containing ceria. Shyu, J. Z.; Otto, K.; Watkins, W. L.

H.; Graham, G. W.; Belitz, R. K.; Gandhi, H. S. (Res. Staff, Ford Mot. Co., Dearborn, MI, 48121, USA). Journal of Catalysis, 114(1), 23-33 (English) 1988. CODEN: JCTLA5. ISSN: 0021-9517.

AB The effects of adding CeO<sub>2</sub> to Pd/Al<sub>2</sub>O<sub>3</sub> as a catalyst modifier were investigated by XPS and x-ray diffraction. Catalytic effects were demonstrated by using propane oxidn. as a model reaction. CeO<sub>2</sub> promotes

oxidn. of Pd to PdO both with and without Al<sub>2</sub>O<sub>3</sub>. High-temp. redn. ( $\sim$ 920°) and the presence of Pd are required for the total conversion to bulk CeAlO<sub>3</sub> from CeO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub>. Pd also assists in the oxidn.

of bulk CeAlO<sub>3</sub> to CeO<sub>2</sub> at elevated temps. In ambient air, Pd facilitates

surface oxidn. of CeAlO<sub>3</sub> to CeO<sub>2</sub>, whereas surface Pd acquires an oxidn.

state between Pd and PdO. On Pd/Al<sub>2</sub>O<sub>3</sub> the propane oxidn. rate is lowered

by CeO<sub>2</sub> if the O concn. exceeds that of the stoichiometric ratio.

CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)  
Section cross-reference(s): 59

IT 7440-05-3, Palladium, uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)  
(catalysts from alumina and, effect of ceria promoter on activity  
and  
structure of)  
IT 1306-38-3, Cerium dioxide, uses and miscellaneous  
RL: USES (Uses)  
(promoter, for palladium-alumina  
catalysts, activity and structure in relation to)

L54 ANSWER 87 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN  
1974:442056 Document No. 81:42056 Catalytic compositions. Hindin, Saul  
G.;

Dettling, Joseph C. (Engelhard Minerals and Chemicals Corp.). Ger.  
Offen.

DE 2339512 19740221, 22 pp. (German). CODEN: GWXXBX. APPLICATION:

DE 1973-2339512 19730803.

AB Catalysts for the afterburning of combustion gases, that consist of a  
Pt

group metal and Cu, Cr, and a rare metal as promoters and are  
active and stable at high temps., are described. The catalysts may be  
prep'd. by impregnating activated Al<sub>2</sub>O<sub>3</sub> pellets with solns. of  
Cu(CH<sub>3</sub>COO)<sub>2</sub>, H<sub>2</sub>CrO<sub>4</sub>, Ce(NO<sub>3</sub>)<sub>3</sub> and Pd(NO<sub>3</sub>)<sub>2</sub>, then  
drying at 100° and igniting at 1000°. In a variant  
procedure, the soln. contg. the promoters was mixed with powd.  
Al<sub>2</sub>O<sub>3</sub> and pellets shaped by extrusion. The pellets were then  
dried at 80° and ignited 2 hr at 1000°; after being  
impregnated with Pd(NO<sub>3</sub>)<sub>2</sub> soln. they were calcined once more 2  
hr at 500°. The finished catalyst contained 0.02 Pd, 1.2  
CuO, 4.1 Cr<sub>2</sub>O<sub>3</sub>, 4.7 CeO<sub>2</sub> and 90 wt. % Al<sub>2</sub>O<sub>3</sub>.

IC B01J; F01N; C07B

CC 67-1 (Catalysis and Reaction Kinetics)

Section cross-reference(s): 59

IT 1306-38-3 1308-38-9, uses and miscellaneous 1317-38-0, uses and  
miscellaneous 7440-05-3, uses and miscellaneous

RL: CAT (Catalyst use); USES (Uses)

(catalyst, for oxidn. of exhaust gases)